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AN ESSAY

ON THE

AGRICULTURAL CAPABILITIES OF S. CAROLINA,

AND THE

BEST MEANS OF DEVELOPING AND IMPROVING THEM.

READ BEFORE THE STATE AGRICULTURAL SOCIETY  
OF SOUTH CAROLINA, IN NOVEMBER, 1847,  
AND SEPTEMBER, 1848,

BY WHITEMARSH B. SEABROOK, PRESIDENT,

AND BY THAT BODY ORDERED TO BE PUBLISHED.

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It is proper I should state that with regard to some of the topics, on which light, derived wholly or in part from the practical knowledge of others, has been attempted to be shed, I have in a few sentences employed almost the precise language of their authors, without using the usual quotation mark.



The agricultural resources of a country are in general capable of indefinite extension. Nowhere has it been ascertained that there is a limit to production. Fully to develop the treasures of the earth requires the existence of influences, always operating and enlarging their sphere of action. If these be wholly wanting, or exercise only a partial sway, the inheritance of a bountiful Providence will forever remain neglected and unimproved.

It is a well established truth, that where nature has done the most, art does the least. Man was wisely created to earn his bread by the sweat of his brow. If it were not for the defects of climate and season; the accidents that frustrate his plans; the agents which mar his hopes and destroy his comforts, the high purposes of his being could never be fulfilled. When aroused to a just sense of his true position on earth by the impellent of necessity, he, then, begins to look into futurity, and to consider the vegetable kingdom, "not as a secure and unalterable inheritance spontaneously providing for his wants, but as a doubtful and insecure possession, to be preserved only by labor, and extended and perfected by ingenuity." The tiller of the ground is indeed unable properly to appreciate what he has gained without an effort. Whenever the choice is between toil and scarcity, and inactivity and abundance, the triumph of the latter feeling is certain and permanent.

That to the ingratitude of her husbandmen to the great Author of the manifold blessings that surround them, the slow progress of agricultural improvement in this State is to be ascribed, will manifestly appear in the sequel of this essay.

What, then, are the agricultural capabilities of South Carolina? In richness, variety and abundance, perhaps no part of the habitable globe of the same territorial extent, exceeds them. Of the four great materials for human clothing,—cotton, wool, silk\* and flax.†—her climate and soil are peculiarly well adapted to the first three, and in locations to the last. Of the prominent articles of food, she produces rice, wheat, Indian corn, oats, rye, barley, sweet and Irish potatoes, and the different varieties of the pea tribe. For the habitation of man, the earth, her granaries and forests, furnish an inexhausti-

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\* In 1759, South Carolina exported 10,000 lbs. of raw silk.

† *Linum Virginicum*, or Virginia flax, is an indigenous plant, and of the same family with *Linum usitatissimum*, or common flax.



ble supply. Iron so essential to the wants of every class in society, is superior in quality, it has been ascertained, to any found in our country. Gold, not too abundant to divert from other and more profitable pursuits, but an inconsiderable amount of capital, excites the enterprize and rewards the labor of a portion of our citizens. In other minerals, hereafter to be noticed, she is neither deficient in quantity nor value. While the woods abound in game, including the deer and turkey, the ocean which laves her southern border, and the numerous streams, both salt and fresh, that penetrate every part of her surface, yield almost every variety of the choicest fish. In relation to medicinal and culinary plants, her catalogue is large. To tobacco, indigo\* and hemp, which once were staple commodities; fruits and esculent vegetables that every where greet the eye; and other productions which minister to the comfort or necessities of her people, it is needless in this place especially to direct your notice. So remarkable indeed is her topographical condition, that wheat† and the sugar cane grow profitably side by side; and the orange and the olive ripen under the provident care of the same family of cultivators who extract the saccharine matter of the maple, but essay in vain to secure the maturity of the native corn of America.‡

To comprehend this subject in all its relations, a more detailed examination is necessary.

1. South Carolina is most favorably situated,§ not only with regard to the States of the Union, but to the other portions of the globe. Midway between the frozen regions of the North and the burning heats of the tropics,—in her climate, seasons and productions, it has been justly represented, that she combines most of the advantages of all. If we except tropical fruits, to which frost is fatal, her capacity successfully to rear all the grains, fruits and esculent roots, which enrich more southern countries, is nearly certain. Her latitude for cotton enjoys an extraordinary advantage. Much further south, the forcing nature of a vertical sun develops the plant too rapidly, thereby

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\* Except in Orangeburg, where it is still a source of profit to a few planters, indigo is nowhere grown in South Carolina. That it is not inferior to that of India, has I understand been recently proved.

† Wheat is cultivated in the State with advantage as low as N. L. 32 30.

‡ From bleak cold winds, the northern side of the glassy mountains, it is said, will not produce maize.

§ Between 32 deg. 4 min. 30 sec. and 35 deg. 12 min. north latitude and 1 deg. 30 min. and 6 deg. 54 min. west longitude from the Capitol at Washington; or 78 deg. 25 min. and 83 deg. 49 min. west longitude from Greenwich.

running it into weed and foliage; it is from the same cause most exposed to the ravages of the caterpillar and other insects. Further north, the season is too short to mature an abundant crop of bolls, while the staple degenerates and becomes less valuable.

From the Sea-Islands the best cotton known to commerce is exported. So circumscribed are the limits in which it can be grown, that a half degree ( $32^{\circ} 10'$  to  $32^{\circ} 40'$ ,) north latitude—of the sea-coast of North America, seems to be the precise point where the length, strength and firmness of the fibre are most happily blended. In reference to rice our State enjoys almost a monopoly.

2. South Carolina includes 30,213 square miles, or 19,435,680 acres. Of this area, there is as little land in one body, the highest authorities\* assure us, unsusceptible of remunerating culture, as the United States can furnish. Undistinguished by mountains with their agricultural disadvantages, it is worthy of remark, that the spurs that make out from the great range which separates the waters falling into the Atlantic ocean and into the Gulf of Mexico, are capable of profitable tillage to their very summits.

3. As a difference of twelve degrees of latitude exists between the western and eastern hemispheres, the countries of the latter which are subject to the same atmospheric influences with South Carolina, comprise the most delightful and fruit-bearing portions of France, Italy, Turkey in Europe, Russia, Tartary and China.

4. Between the primitive and alluvial formations, the State is nearly equally divided. The soils, though of every kind, may be said to comprehend six varieties,† each the best suited to a certain crop, yet all of them capable of advantageously producing three-fourths of the vegetable products grown in its limits. While local differences are everywhere observable, the surface and soil of the Upper Districts present a great similarity; and this is equally true of the Lower country. In the former, the lands are broken and hilly; in the latter, level; oak is the natural growth of the one; pine of the other. Clay is the soil of much the larger portion of the State; and, except in the immediate vicinity of the ocean, is almost the universal substratum. A close stiff land predominates generally in the Parishes, and an open sand on the Sea-Islands.

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\* Messrs. Ruffin and Tuomey, late agricultural surveyors of the State.

† 1. Tide swamp, now appropriated to the culture of rice; 2. inland swamp, to rice, cotton, corn, peas, &c. &c.; 3. salt marsh, to long cotton; 4. Oak and pine, to long cotton, corn, potatoes, &c. &c.; 5. Oak and hickory, to short cotton, corn, &c. &c.; 6. Pine barren, to fruits, vegetables &c. &c.



The high lands of the country above the falls of the rivers are naturally much superior to those of the pine-covered region, but the alluvial bottoms of the former are greatly surpassed in richness by the river swamps of the latter. In its capacity for permanent improvement, the granite half of the State has been more highly favored by nature than the alluvial. This is mainly ascribable to the open texture, permeable to water, of its clayey subsoil, and the potash in the soil and subsoil formed by the decomposition of the felspar and mica of the granite. In a few localities, however, the depth of the substratum and its proximity to the surface offer serious obstacles to a higher production. These, among other causes, seem yet to be operating against the cultivation of perhaps the greater part of those peculiar soils known as the "Flat Woods" of Abbeville; those in the neighborhood of Dutchman's creek and Wateree creek in Fairfield; and the Black Jack lands of Chester. Deriving their fertility from the hornblende\* of the disintegrated rocks which lie below the close clay subsoil, it would appear that steady industry, incited and directed by ordinary skill, was alone wanting to preserve and perpetuate the uncommon productiveness, which, in despite of long-continued and improvident tillage, still distinguishes these remarkable tracts of land.

In reference to the soils of the primitive country, to one more peculiarity only, shall I now advert. Where the rocks lie horizontally, it is known that the soils derived from clay states frequently suffer from the impenetrable nature of the sub-soil and the position of the underlying rocks. In the regions to which they are confined in this State, they "are all highly inclined, presenting their edges to the surface and allowing the water to percolate between the strata."

5. The swamps, covering 2000 square miles of land of inexhaustible fertility, are capable of thorough and economical drainage, and conversion into active and available capital.

The Pine lands, embracing about 6,000,000 of acres, constitute the most neglected section of the State. While in some quarters, they are erroneously regarded as valuable only for the abundance and quality of their timber, in others, the belief is equally unsound, that their productive capacity is limited to plants which flourish solely in a thin and feeble soil. That, in all its relations, it is a district of country of immeasurable value to our community, will hereafter be attempted to be shown.

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\* Hornblende contains about 12 per cent. of lime, and about 30 per cent. of iron.



6. South Carolina is most bountifully supplied with water. The base of her triangular form is washed with the ocean, and one of her lateral sides rests on a river accessible to vessels more than one-half its length, and small boats 100 miles beyond. Many bold and navigable streams, with numerous tributaries coursing through her territory in every direction, disembogue into the Atlantic at distances from each other the most suitable for the purposes of intercommunication and traffic. Before reaching the points where all traces of their distinctive character are lost forever, by united contributions, they form a bold channel between the main land and the sea islands the entire width of the State. Apart from the creeks and inlets of the sea, there is now an inland navigation equal to about 2,400 miles.

7. Greenville is the only division of our domain without the benefit of navigation. In all the Districts, however, water courses abound, which afford remarkably eligible sites for mills. The rocks cross the streams nearly at right angles, and hence form a series of natural dams across their beds, and make falls that vary from 5 to 80 feet in comparatively short distances. In perhaps no equal extent of territory are there so many advantages of this sort presented.

In connexion with this subject it is proper to add, that the metropolis of the State is only 7 miles from the ocean; that its harbor is spacious, well protected from storms and at all times accessible.

8. Surprising to many as may be the declaration, South Carolina, in reference to her whole population, is a very healthy country, and by no means a sickly one with regard to her white inhabitants. If the alluvial region, and a few of the middle Districts are subject to fevers in summer, the whole State in winter is comparatively exempt from the diseases to which more Northern climes are peculiarly liable. The assertion too, is with entire confidence made, that, even during the hot months, in perhaps one half of her limits, foreigners may reside not only with impunity, but with renovated constitutions. In the neighborhood of every locality in which mephitic exhalations show the fatality of their power, there are sites for settlements where vigorous health, under the ordinary safeguards, is always secured.—The entire sand-hill country and pine lands generally, as well as our towns and villages, furnish the most signal evidence of the salubrity of their atmospheric influence. It may here be appropriately observed that, while from causes, several of which are among the arcana of nature, the lower division is becoming gradually but steadily healthier, a portion of the middle zone is decidedly more liable to maladies of a fatal character. If a better system of drainage and other improve-

ments in the cultivation of the ground, do not satisfactorily account for the one, certain agricultural practices are perhaps sufficient to explain the other. For the diseases which occasionally clothe in the habiliments of mourning the people of Abbeville, Union, Chester and York, it is supposed that the planters of those Districts are competent to the diminution of the sources whence they spring. It is not unworthy of special remark, that the atmosphere of the swamps and marshes so poisonous to the white man, is at all times innocuous to his slave. If it were not for this merciful provision of an all-wise Being, the alluvial region of South Carolina, in the immediate vicinity of its water courses, would soon become a dreary waste, and tenanted only by the beasts of the forest.

Of the cities of the Union, Charleston, and it may be added, Columbia, show a lower mortality among their *acclimated* inhabitants than any others. With regard to the former, the number of deaths from all fevers (the endemic of the State) except from yellow fever, for the last 18 years, is 656, and in any one year 81, in a population of between 30 and 40,000. From yellow fever, which has prevailed as an epidemic but twice in 22 years, for the same period, the aggregate number of deaths is 646. The average mortality for the last 6 years, all classes included, is 1 in 51; blacks\* alone, 1 in 44; whites alone, 1 in 58†.

9. The natural means of resuscitating the soil are abundant and widely diffused. A large portion of the lower country show exhaustless beds of the richest marl. Limestone, though obtainable only in York, Spartanburg, Laurens and Pickens, exists in such quantity in the first two Districts, that, by railway communications, the entire primitive region will, at no distant day, be furnished with this earth, so essen-

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\* "In Charleston," says the Commercial Review, of May '47, "the mortality under 5 years is 31 per cent; in Boston it is 46. There are more deaths in Philadelphia from all fevers, including typhus and malarial, than from all fevers in Charleston, including yellow fever. From 1820 to 1830, in Philadelphia the deaths from fevers were 13 and 5-10 per cent. on all the deaths. In Charleston, for the last 18 years, including 2 epidemics, the average mortality from fevers was 11 and 4-10; leaving out yellow fever, which attacks almost exclusively strangers, the mortality from other fevers will not be found to exceed 7 per cent."

† It appears from tables furnished a writer in the Commercial Review by Dr. G. Emerson, that the average mortality in Philadelphia among the *colored* population from 1821 to 1840, inclusive, was 1 in 26; in Charleston, we know that for that time it was 1 in 44. In Boston the average mortality, it is said, (see writer in the Boston Medical and Surgical Journal, Nov. 1842) is 1 in 15. Why, in reference to the colored population, have vital statistics ceased to be published at the North? Let the abolitionists answer.



tial to the nutrition and development of plants. While the sea-shore Parishes possess unfailing supplies of salt mud, salt grass, and shell lime, two-thirds of the State are most amply furnished with swamp mud and peat.

10. Of minerals and the primitive rocks, the number of the former is 28 ; of the latter, 9.

11. The botany of the State consists of about 3,000 species of plants. Of these 2,000 are flowering, and 1,000 unprovided with flowers as parts of their organs of fructification. In relation to the former, about 65 are naturalized ; that is, *foreign* plants introduced and now growing *wild*. There are about 150 grasses, of which 15 are natives ; 30 species of esculent, (for man) of which 3 or 4 are naturalized ; and about 70 more used in medicine, agriculture and the arts, of which 5 or 6 are naturalized.

12. As a member of the Union, South Carolina in population occupies the eleventh rank ; in territorial extent, the twenty-second ; in the value of her *agricultural* exports, the fifth ; in the value of the goods, wares and merchandize of the growth, produce and manufacture of the United States\*, the thirteenth.

The very large contribution of this State to the national wealth, which is determined by the amount and value of her domestic exports, and not her imports†, comes too, from a limited part of her soil. The

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\* EXPORTED FROM CHARLESTON IN

1820—\$8,690,539.	1829—\$8,134,676.	1838—\$11,017,391.
1821— 6,867,515.	1830— 7,580,821.	1839— 10,318,822.
1822— 7,136,366.	1831— 6,528,605.	1840— 8,990,048.
1823— 6,671,998.	1832— 7,685,833.	1841— 8,598,257.
1824— 7,833,713.	1833— 8,337,512.	1842— 8,091,542.
1825—10,876,475.	1834—11,119,565.	1843— 7,010,631.
1826— 7,468,966.	1835—11,224,298.	1844— 8,578,515.
1827— 8,189,496.	1836—13,482,757.	1845— 8,366,250.
1828— 6,508,570.	1837—11,138,992.	1846— 8,284,405.
		1847— 7,783,038.

The value of the exports from '40 to '47 inclusive, has been furnished by the Hon. W. J. Grayson ; the information for the previous years is extracted from DeBow's Commercial Review.

† DUTIES RECEIVED IN CHARLESTON FOR THE YEARS

1834—\$467,000
1835— 464,000
1836— 701,000—Year of speculation and high prices.
1837— 474,000
1838— 590,000
1839— 640,000—Year of high prices.
1842— 300,000
1843— 340,000
1844— 490,000
1845— 390,000
1846— 280,000
1847— 387,000

The years '40 and '41, remarks the Hon. W. J. Grayson, (Collector) are omitted, the record in the office being incomplete. The first and second quarters of 1840 amounted to \$192,000, and the last quarter of 1841 to \$116,000.



estimated number of acres in cultivation in 1820, was 1,221,000; at present it does not exceed 2,000,000, or about 1-10 of her *arable* lands.

13. Taking the Census of 1840 as a basis of calculation, South Carolina produces *communibus annis*.

Of Cotton,	- - - - -	lbs. 61,710,274
Rice,	- - - - -	60,590,861
Sugar,	- - - - -	30,000
Wheat,	- - - - -	968,354
Oats,	- - - - -	1,486,208
Indian Corn,	- - - - -	14,722,805
Rye,	- - - - -	44,738
Tobacco,	- - - - -	51,519
Wool,	- - - - -	299,170
Tons of Hay,	- - - - -	24,618
Potatoes,	- - - - -	2,698,313
Silk Cocoons,	- - - - -	2,080
Barley, Buckwheat, Hops and Wax,	-	19,989
Value of Lumber produce,	- - -	\$537,684
Barrels of Tar, Pitch, Turpentine and Rosin,		735

If we divide their income, about \$31,000,000, by the whole population, 594,398, the share of each is \$52; of the white population alone \$119. Of rice, wheat and potatoes, the quantity per head is 108 lbs.; if one-half the amount of Indian corn be added, the quantity of bread food per head, omitting inferior productions, is 120 lbs.—Of Cotton and Wool, the share to each inhabitant is 104 lbs. If the white population be divided into families of 4, (64,777,) there will be of horses and mules 2 to each; of neat cattle 8  $\frac{3}{4}$ ; of sheep 3  $\frac{1}{2}$ , and of swine 13  $\frac{1}{2}$ . In reference to the whole population, the proportion of each, in neat cattle, sheep and hogs is about 2  $\frac{3}{4}$ . Supposing three fourths of the white families (48,582) to be engaged in agriculture, and that 2,000,000 of acres are in cultivation, each family tills 41 acres, and realizes \$476, or \$11.60 an acre.

Such is a concise and very imperfect review of the agricultural and physical capabilities of South Carolina. To the question, therefore, what new fruits for exportation or domestic consumption is she capable of producing—a satisfactory, though general answer, may be found in the following considerations to which only a very brief allusion shall be made. In all countries the vegetable products of the highest value are introduced, not indigenous. It is said that scarcely a single plant is found common to Africa and South America.—Where the climate is the same, many of the plants are dissimilar.—

This is especially true of certain parts of Europe and North America. Except Indian corn,\* the staple and other cultivated crops of South Carolina are derived wholly from acclimated plants. By a transfer of locality plants undergo great changes. These are wrought in them mainly by temperature, cultivation, climate and soil: other causes, however, contribute their aid, such as mountains, lakes, rivers, proximity to the ocean, humidity of the air, sudden transitions from heat to cold, and length of winter and summer. The tendency of plants is to accommodate themselves to the region into which they are introduced. While productive of many varieties, their specific character is always preserved. If taken to a warmer country, the growth is more luxuriant—they take a longer time to come to maturity, and yield less fruit but more foliage. On the contrary, the effect of a colder climate is the very reverse of all this. Indian corn at the North is about 5 feet high; at the South from 7 to 10 feet, and in the West Indies from 15 to 20 feet. Such is the influence of climate.—By cultivation still greater changes are induced. From the harsh English crab, have sprung all the varieties of the apple; the luscious peach in its native locality is bitter and unpalatable; the turnip is “derived from a plant scarcely distinguishable in its stem or root from the field mustard.” In their meliorating influence on plants, cultivation perhaps is the most powerful instrument. “In Europe,” says Humboldt, “the vine followed the Greek; the wheat the Romans; and the cotton the Arabs. In America, the Tulteques carried with them the maize; and the potato and the quinoa are found wherever have migrated the ancient Condinamarca.”

With especial reference to production, we should look to the most northern regions where the plants naturally grow, or where they have been naturalized. While the *Morus-multicaulis* of the Philippine Islands within the tropics, was always injured by the winters of the Northern States, the plants brought from the East, and especially from China, where they had been acclimated, resisted the severest cold. For this reason, the olive should be introduced from the Crimea, where it flourishes; though according to Bishop Heber, all the countries belonging to the Euxine Sea are still subject to an annual severity of winter of which the inhabitants of Britain can hardly form an idea. As a general rule, the countries of the old world between the 34th and 47th degrees of north latitude, should furnish plants that

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\* Seven or eight species of Indigo are found in the United States. The Wild Indigo (*Dyer's Baptisia*) is common in the middle and Southern sections of our country. The *Indigo fera cerulea* yields the finest Indigo.



would flourish in South Carolina. The climate of China strongly resembles that of the United States. Both countries are remarkable for very hot summers and cold winters; their western coasts are also more uniform in temperature and assimilate in climetric laws\*; and in their geographical configuration the same similarity is observable. As the Chinese moreover, are from necessity far advanced in agriculture, and they have been introducing into their southern limits southern and tropical plants for many centuries, which have gradually extended north, it is probable that, from the acclimated plants and fruits of that extensive empire, a selection adapted to this State might be advantageously made†. In further elucidation of the suggestion indirectly adverted to, that cultivated plants yield the greatest or best products near the northernmost limits in which they will grow, it may be further observed, that cotton, though a tropical plant, is brought to the greatest perfection in higher latitudes. In quantity and quality the West India Planter has been compelled to yield to the superior atmospheric influence under which that crop is now grown in the United States. Rice, though also a native of the tropical region, yet the two Carolinas furnish the best in the world. Indian corn, originally discovered near the tropics, attains its greatest perfection in the cold sections of the country. At the North, wheat is a more certain crop than in the Southern States. The best grasses are to be found in cool regions. As you approach the tropics, the heat of the sun forces plants to a false maturity, runs them on too rapidly to fructification, and renders dry and woody the culms, stalks, and leaves of the plants, where the parts are used.

The prevalence of insects is another bar to the productiveness of southern plants; swarms of these invade and strip the leaves and bore the fruit, which lead to blight and decomposition; and just in proportion as the labors of man have rendered plants succulent, and their fruit and seed sweet and pleasant, do these insects multiply on them,

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* MEAN TEMPERATURE OF THE			
	Warmest Month.	The Coldest.	
Canton,	84 deg. 50 min.	57 deg.	
Pekin,	84 deg. 38 min.	24 deg. 62 min.	
	<i>out of doors.</i>	<i>in doors.</i>	<i>out of doors. in doors.</i>
Charleston, 1846-82 d. 45 m. 40 s.—81 d. 07 m. 40 s.—	49 deg. 49 m.—48 d. 10 m.		
1847-80 d. 41 m. 40 s.—80 d. 16 m. 40 s.—	52 deg. 21 m.—59 d. 98 m. 20 s.		
Latitude,	23 deg. 10 m. North—113-13	East Longitude.	
"	39 deg. 54 m. " —116-27		

† "Last year," remarks Dr. Barratt of Abbeville, "the best and sweetest flour (wheat) was obtained from Chinese seed."



and thereby defeat the object of husbandry. These considerations are well calculated to check improvident calculators, and to limit our efforts to the devising only of schemes from which results certain and profitable may be realized. If, then, from natural inhibitions we cannot compete with our northern friends in the markets of the world in the abundance and quality of wheat, and in the richness and nutritive property of native or naturalized grasses, still both may advantageously be grown not only for domestic consumption, but, in consequence of its earlier maturity, for exportation also, and in regard to the latter, as constituting the basis of extensive agricultural improvement. After all, however, the subject of the introduction of new plants into our country is comparatively of subordinate interest to South Carolina.

In her borders, there is scarcely a vegetable product, essential to the use of the human race, which cannot be furnished. There is, moreover, not one valuable crop in the United States, which she does not or cannot grow, or find a substitute for. Whence, then, this yearning after fruits of other regions? Is not the botany of the State sufficiently large to satisfy the warmest wishes of its best friends? Experiments with new plants may be of public utility, but the reculture of some, and extended tillage of others, indigenous and naturalized, is obviously our true policy. Wheat and Indian corn are at length articles of exportation, to which oats, peas, and probably rye, will shortly be added. Attention is beginning to be excited concerning tobacco, hemp, indigo and flax. The silk culture; the vine\*; the sugar cane, and perhaps the sugar beet; the olive; the bean plant; the ground-nut; the castor oil bean; the poppy; the

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\* North Carolina is the wine-producing State of the Union. What many of her farmers have done in this department of industry, can be accomplished in South Carolina.

As a general rule, it may be asserted that scarcely a single variety of foreign grapes is adapted to American culture. For vineyards, the best of the native grapes are the Scuppernong, Weller's Halifax, Norton's Virginia Seedling, Lenoir, North Carolina, Hunterville and Franklin. Of the Scuppernong, which, it is said, will thrive well every wheresouth of latitude about 37 deg., 2,000 gallons per acre have frequently been produced in North Carolina. This grape cannot be propagated successfully by cuttings, but by layers or grafting. In the hands of the skilful manufacturer, the wines made from it, command readily in market from \$1 to \$4 per gallon, according to quality. "I sold at Raleigh," observes Dr. Weller, "to members of the Legislature, and other good judges of wine, (pronouncing it superior to any foreign,) at \$4 a gallon, under the name of the *red Scuppernong Hock*; and the other kind called the *white Scuppernong Hock*, sold at \$2 a gallon—a remarkable difference arising from the quality of the sugar."

"The vine," says the Hon. J. R. Poinsett, "requires good rich loam, with a due admixture of the phosphate or carbonate of lime, or of such materials and salts as are present in volcanic soils; and even such lands will not produce grapes having that proportion of saccharine matter which is requisite to make good wine without a bountiful supply of rich manure."

arrow root; the sun flower; the bear grass: to these, which are well known to our cultivators, the colza\*, the cork, and the camphor trees, and plants that, from a fibrous structure of the bark, are capable of being employed in making ropes, thread and cloth; and madder, woad and other dye-yielding products, it may become the interest of the agriculturist to turn his attention.

The better to understand the second branch of my subject, I shall divide South Carolina into three great zones, and as a preliminary inquiry, point out the course which circumstances admonish the agriculturist of each at this time to pursue. On one of two crops only, does the planter of the lower zone depend for the reward due to his labor. With some important modifications, this is still his true policy. Let his cotton, rice or lumber, be considered his net gain, and his other products, or interest on capital, as the instrument of defraying the expenses of the plantation and from all other sources. At present on a single article falls every disbursement including occasional supplies of food for his people, and not unfrequently his horses and mules. As long as so unwise a system continues, the rich may continue to revel in abundance, but the road of prosperity and contentment will be closed to the needy and the embarrassed. Hence, in the suggestions about to be offered, I ask it to be assumed, that the supply of corn and potatoes—the aliment of the black population—of grain and fodder for the working animals—is at least equal to the requirements of the plantation.

The rice of the Carolinas is the best known to commerce. It is larger and better tasted than that of India, though, it is believed, a native of that region. The consumption of this grain is gradually extending not only in North America, but in Europe. Should the potato† (*Solanum tuberosum*) cease to be grown in the countries of the old world where it is now so extensively cultivated, rice may yet become one of its substitutes. In nutritive properties, it ranks only below wheat, and is far superior to the other cereal grasses for the use of man. As an article of diet it stands pre-eminent among other vegetables. Its intrinsic value as food; the unrivalled quality of the rice we produce; and the vast but unreclaimed grounds, applicable

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\* In French and Flemish husbandry, the colza is of immense importance. It is cultivated for its seed, which are crushed and pressed for their oil, which is burned in lamps. The farmers use the cake either alone or mixed with other substances, as food for cattle, or to make into manure for various crops.

† A native of South America. Imported into England by Sir Walter Raleigh, and first grown at Youghall, in Ireland.



to its growth;\* are so many weighty reasons in favor of its extended cultivation in South Carolina.†

Perseverance in the making of cotton the main crop is based on reasons equally valid. Though the new soils of the South west are capable of yielding heavier returns than those of So. Ca., which have been worked unceasingly for more than half a century, yet we have millions of uncleared acres of unsurpassed fertility which seem to solicit a trial of their powers for the staples of the plantation States. Whether these shall be subjected to the dominion of the plough, or scientific efforts in the resuscitation of our old fields be made, is the great problem to be solved. That either plan, as a mere matter of pecuniary gain, is preferable to that of emigration, the sad experience of many of our fellow citizens is prepared to testify.

2. The almost universal belief of an over production of cotton is untrue. As this is a question of fact and not of argument, to statistical information we must resort for proof.‡

3. If an immeasurable extent of fertile country in the U. S. is well adapted to the cotton husbandry, it should be remembered, that the number of laborers is limited. The quantity of our main staple, therefore, cannot be indefinitely increased. It must continue to bear a direct relation to the improved skill of the grower, the amount of fresh soil devoted to its production, and the natural increase of the black population.

4. That the cultivation of cotton is a more profitable business in the U. S., than in other regions, the increased and increasing exports of that crop from our country, and the diminished exports from all other quarters to Europe, most fully attest. The time indeed seems to be rapidly approaching when the raw material for European con-

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\* It grows well in all the low rich grounds of the State. Even in Pickens, 60 bushels per acre have been realized. It was once extensively cultivated in Richland, and it would now, in locations, be a much more profitable crop in that District than cotton.

† At the time of the Revolution the two swamps in the Parish of St. Paul's contained 126 settled plantations; in 1824, the number was eight; at this time, it is said, there are but two. Desolate is the dwelling of Moina; silence is in the house of her fathers. The mournful language of Ossian is indeed applicable to other sections of the lower country. The cotton culture superceded that of rice in a large portion of the State, and in its final results has converted regions of golden harvests into pestilential morasses.

‡ See report of Committee of the S. Agri. Soc. on the policy of diminishing the cotton culture in South Carolina.



sumption, will be drawn wholly from this portion of North America.\*

5. It is within the range of probability, that cotton at no distant day will cease to be grown in the Gulf states. A feeble insect has already issued its decree, to which the power of haughty man must submissively yield. The ravages of the caterpillar caused the abandonment of cotton, as a crop, in the West Indies. The appearance of this enemy, south of 30 deg. north latitude, which in the beginning was only occasional, say once in 3 or 4 years, is now not only annual, but earlier every season. In a region so warm and otherwise favorable to the multiplication and propagation of the insect tribe, the hybernation of the cotton caterpillar (*Noctua Xylina*) is no longer a moot point. It is, hence, nearly certain, that the planter is destined to have yearly ocular proof of its existence. But apart from this consideration, a diminution of the cotton crop in the South-western states will flow from the greater profits of sugar, the result of the superior adaptation of the prolific soils of that section to the cane, to which is now to be added the extinction of slavery in all the West India Islands. Numerous mills are now in the progress of erection in Texas,† in Mississippi and Louisiana. From the annual loss which probably will hereafter be incurred from the inroads of the caterpillar, I hesitate not to say, that, independent of sugar, rice or tobacco will more highly remunerate the industrious planter of those countries than the great crop to which he has so long exclusively devoted his labour.

Such are the chief reasons why perseverance in the production of cotton is perhaps the duty of the cultivators of the alluvial region.—The enlargement of the lumber trade, which is rising rapidly in value, and the new and most lucrative business of extracting and manufacturing the resinous product of the long-leaved pine, (*Pinus Australia*,) will obviously, and to all the great interests of the State, most beneficially withdraw a considerable portion of capital invested in the cotton culture.

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\* In the manufacture of cotton goods, only  $\frac{1}{4}$  of other cotton is used in Great Britain.

From Mr. McQueen's evidence before the Parliamentary Committee on the navigation laws, it appears that, from 1820 to 1846, 27 years, Great Britain imported from the United States, 7,576,152,722 lbs. or 3,337,560 tons of cotton, which at  $8\frac{1}{4}$  per lb. is £268,322,835.

† Of the crop of 1846, 50 hhds. of Sugar were exported from Texas. This year the production will probably amount to at least 5000 hhds., and the amount is likely to increase full 50 per cent. per year for some years to come.—*Galveston News*.

The middle zone presents a field equally wide for the operations of the husbandman. To the catalogue of plants already mentioned, nearly every one of which will prove valuable to it, wheat deserves a conspicuous place, not as the main crop, but as among the first of the saving crops. Many planters of this region are already prepared to adopt a new scheme of husbandry. In furtherance of their design, railroads will enable them to equalize the proportion of cotton and grain to the demand; in other words, to grow one or the other, or both for market, as circumstances might justify. In these various ways, it is reasonable to suppose that, in a few years, a very material reduction in the number of acres now in cotton will take place.

In the improved system of husbandry which the upper zone demands, the total abandonment of cotton as a marketable crop, is the first in a series of measures essential to reform. The reasons for its cultivation having long ceased, on new staples must the farmer hereafter depend. To wheat and the cereal and other grasses should he look. The first as his clear profit crop—to the others, as the basis of sheep husbandry, and for the permanent improvement of his estate. In order to develop the agricultural resources of the State, to four agents only is it important to refer, and the first in the scale of value, and from which the others derive their power, is education. As the general subject has been prudently consigned to another member\* of the Society, my remarks shall be confined within narrow limits.

I hazard nothing in the assertion, that an effectual amelioration of our agricultural condition primarily depends on the enlightenment of the public mind. To expand the current of thought—break down prejudices—give him a true view of the high character of his calling; in a word, to effect a revolution in his habits and practices, the cultivator of the soil must look almost exclusively to intellectual advancement. A man who cannot read is a being not contemplated by the genius of our Constitution. The paramount duties of the constituted authorities should therefore be to promote by all proper expedients the full developement of the mental faculties of their constituency; and to give them a direction adapted to the variant pursuits into which the necessities of society divide mankind. In this State, the mass of ignorance is alarmingly large.† Our Free School system, in design and execution, is notoriously defective. The education of the middle classes in society, rests on no stable and determinate plan.

\* Hon. R. F. W. Allston.

† Over 20,000, in a white population of 259,084, cannot read or write.



The South Carolina College aims at the acquisition of every branch of knowledge by the student, except in relation to the profession in which nine-tenths of the people, sooner or later, are certain to embark.\* There was a time, when, in reference to the old States, agriculture was solely an art. It is now not only a science, but legitimately entitled to be ranked as the most useful and comprehensive of all the sciences. If, in parts of the globe, especially in North America, the land may still be advantageously tilled even by the unlettered boor, sad experience has convinced mankind, that the soil is exhaustible, and that the means of restoring it to its natural state by the application of proper aliment and in suitable quantities, is knowledge yet to be acquired. In despite of the discouraging change which the incautious and opinionated husbandman has wrought in the condition of the most enlightened nations, the inutility of learning to the follower of his pursuit continues to be the settled public conviction. To dissipate that belief, reason, it is apprehended, will long be found to be a poor and inefficient guide. The appalling calamity with which a portion of Europe has so recently been visited, is probably doing more to elevate the profession of the agriculturist, and to show the necessity of the culture of his mind, than mere argument, however well and energetically directed, is capable of accomplishing. Behold the sombre and afflictive scene which still flits before the mental vision.—Thousands of our fellow-creatures prematurely consigned to the grave; the greatest nation the sun has ever set upon, alarmingly weakened in her physical power; the very people and government too, the most fanatical in their proclaimed purpose of razing to their foundation the domestic institutions of the South, gladly and freely expending their gold by which these are strengthened and supported; a large extent of one of the most populous and important divisions of the globe in a condition of deep disquietude;—all occasioned by the failure of a single esculent. To the discovery of a remedy for the disease which is obliterating it from the list of European edibles, the concentrated rays of science are now directed. Suppose the destruction of the cotton crop of our country. The national evils that would

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\* I desire not to be misunderstood. The chief object of education is not to fill the mind with facts, but to train it—to discipline and strengthen it; in a word, to develope and invigorate the intellectual powers. Useful knowledge, or that which is the best suited to the wants of the people, can always, however, be advantageously imparted, in a greater or lesser degree, during the process of mental training. This is not done to the extent to which it might most profitably be carried in our State College.



ensue, the imagination in the exercise of its highest graphic powers, would be incapable of portraying. The arm of industry would be paralyzed; nearly every pursuit prostrated; and while the United States and Great Britain, especially the latter, would be brought to the very verge of ruin, no civilized power would escape the blighting effects which so terrible a visitation would inflict. Reverse the picture. A plant is discovered superior to flax or cotton, as an economical material for woven tissue, or to wheat, as food for man.—What mighty results would quickly follow. The whole trade of the world in a year would be revolutionized; and one of the supposed greatest gifts of God to man be levelled to the rank occupied by the subordinate productions of the earth; or if retaining its value as an article of use, some other would cease to be grown by which entire communities are now supported, and without which they would be impoverished. Now, may I ask, whether there is any argument so powerful as this view of the subject presents, to show the necessity, in a country of exhausted soils, of intellectual progress in our rural condition. However strong may be the reasons in other communities in favor of so obvious a policy, they apply with redoubled force to the slave-holding sections of the Union. If, from unprofitable harvests, the servant should become a burden to his master, the shouts of the fanatic may yet be heard in his own domicil.

In South Carolina, distinguished for the intelligence and sagacity of her people, and an ardent desire on their part to further the public interest, it is a matter of profound astonishment that the vital subject of agricultural improvement is still practically considered as one of inferior moment. The causes of this unfortunate belief are numerous, but they all radiate from the common centre, where ignorance sits enthroned. The mind cannot be brought to the conclusion, that knowledge is essential in the diversified operations of the husbandman: With a tiller of the soil the idea of inferiority is associated; labor avowedly is commendable, but in practice, degrading. The lawyer in preparing his briefs; the physician in compounding his medicines; the politician in arranging his plans, are all engaged in honorable and dignified services: but the agriculturist in studying nature; in providing for the wants of the world by which human misery is alleviated, and the great purposes of the Deity the best advanced; and in imparting value to all other professions, is supposed capable of working profitably in mental darkness; the intellectual sun having been set apart mainly to guide the followers of other and more limited pursuits in life. Of this assemblage, com-



posed of the very *elite* of the State in character, learning and moral elevation, how many are acquainted with the vegetable, animal and mineral kingdoms, and the atmosphere in relation to agriculture, or with the mechanical agents employed in that division of labor?—How many can tell the constituent parts of the soil that is tilled—the plants that are cultivated; or the artificial food by which both are nourished and improved?

From dust we sprang; upon its elements we depend primarily for food, raiment and shelter; and to its bosom, as our final resting place, we are destined to return: yet the mind, in its diversified engagements, seldom casts even a furtive glance on the great subject of the earth, and the countless blessings of which it is the fruitful mother. A man of education should be ashamed to confess his acquaintance with the whole range of knowledge, except that portion which God in his goodness communicated to our first parents. He is not asked to know the mechanical operations common to the art, but the principles which constitute its law. How happens it that the agricultural survey has been discontinued? A belief in its inutility? I am unwilling to suppose that that was the real motive. Three years ago there were 25 principal and 40 assistant geologists engaged, under the patronage of the State governments,\* in the examination of the various parts of the Union. The British Provinces of Nova Scotia, New Brunswick and the Canadas, are now in the progress of exploration. As far as I am informed, South Carolina is the only member of our Confederacy that has voluntarily abandoned the enterprize. This injudicious and unfavorable measure is unfortunately too, not the only evidence that new lights are needed by the statesman as well as the husbandman. Is geology taught in our State College? No! Yet, to the cultivator this science is only inferior in value to chemistry, which is daily unfolding to him new and important facts, and solving hitherto inscrutable mysteries. In 1839, the Agricultural Convention assembled in this place, unani-

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\* North Carolina has been explored by Professor Olmsted; Massachusetts by Prof. Hitchcock; Tennessee by Prof. Troost; Maryland by Prof. Ducatel; New Jersey and Pennsylvania by Prof. H. D. Rodgers; Delaware by Prof. J. C. Booth; New York by Profs. Vanuxem, Mather, Emmons and Mr. James Hall; Virginia by Prof. William B. Rogers; Maine, Rhode Island and New Hampshire, by Dr. Charles T. Jackson. Connecticut by Dr. J. G. Percival and Prof. C. U. Shepard; Ohio by Prof. Mather, assisted by Dr. S. P. Hildreth, and Profs. Locke, Briggs and Foster; Michigan by Mr. D. Houghton; Indiana by Dr. D. D. Owen; and Georgia by Mr. J. R. Cotting. South Carolina has been partially surveyed by Prof. Vanuxem, Mr. Ruffin and Mr. Tuomey.



mously resolved to request the Trustees of the South Carolina College to have delivered by the Professor of Chemistry, in addition to his other duties, a course of lectures on agricultural chemistry, and the principles of geology. This request, in reference to geology, has never been acceded to, and granted only in part concerning agricultural chemistry. With due deference I submit, whether it is not advisable for this Body to ask of the Board of Trustees, why the recommendation of the Agricultural Convention has been disregarded.\*

Should the Constituted Authorities continue heedless of the fact, and look with indifference at the threatening indications abroad; should they withhold their assent to the plan of teaching the grammar of agricultural science, I trust they will grant to the youth of our State the humble privilege of constituting themselves their own instructors, by placing in the State College library, the ablest treatises and best periodicals of the day on husbandry.† Of the seed thus silently sown, some few will doubtless vegetate and produce fruit, which may enlarge and assist to perpetuate the blessings we enjoy.

2. The next means of developing the resources of South Carolina is associated effort. This I am fully aware is a work of difficulty, and while the erroneous and wide-spread belief exists, that practice is the only guide to profitable and certain results, it may be pro-

\* At a meeting of the Board of Trustees in December last, a resolution concerning the expediency of having taught in the College, geology and the principles of Agricultural chemistry, was referred to the Faculty. During the Presidency of Dr. Cooper, a specific course of lectures was annually delivered on geology. His imprudence brought this valuable science into disrepute. I am now satisfied, that it will again constitute a part of the collegiate course.

† Harte's Essay on Husbandry, London, 1770; Works of Arthur Young, 9 in number, from 1771 to 1779, London; Dickson's Husbandry of the Ancients, Edinburgh, 1778; Browne's Treatise on Agriculture and Rural Affairs, Edinburgh, 1811; Loudon's Encyclopædia of Agriculture, London, 1844; Low's Elements of Practical Agriculture. London, 1838; Principles of Tillage and Vegetation by Tull, London; Kirwan's Manures, London, 1838; Davy's Agricultural Chemistry, London, 1821; Beaton's New System of Cultivation; Chemistry for Farmers, and Treatises on soils by Sprengel, 1831; Liebig's Organic Chemistry; Johnson's Agricultural Chemistry; Works of Boussingault, Dames and Mulder; Gardener's Farmer's Dictionary; Armstrong's Agriculture; and American Farmer's Encyclopædia, Philadelphia, 1844.

To these should be added Edmund Ruffin's Essay on calcareous manures, and Ruffin's Farmer's Register; The Farmer's Library and Monthly Journal of Agriculture by J. S. Skinner, N. Y.; American Quarterly Review of Agriculture, Albany, N. Y.; American Farmer, Baltimore; N. C. Farmer, Raleigh Monthly; Southern Cultivator, Augusta, Georgia, Monthly; Alabama Planter, Tuscaloosa, Alabama Monthly; Nashville Agriculturist, Nashville, Monthly.



nounced unattainable. The general intelligence, and all the information in relation to their pursuits which the agriculturists, as a class, possess, should constitute a fund, to which they should freely contribute, and which they should be proud liberally to draw. Without concentration of opinion and action, the results of labor are impotent and unprogressive. Associations for agricultural improvement have long been established in every country, and their recent rapid multiplication is high evidence of the diffusion of intelligence. Since I have had the honor of officiating as President of this body, my best reflections have led me to look to this great moral engine as one of indispensable utility. Six years ago there were but 7 local Societies in the State; the number at present is 32. That all of them are in a prosperous condition, or that the spirit which characterised their early proceedings is still manifested, it is much to be feared is untrue. While, in reference to a few, it is certain that inaction and apathy mark their present course, others, I am gratified to say, are in a state of enviable prosperity and usefulness. If only one member of society in each district could be found with sufficient energy to use the ordinary means of awakening the attention of the people to the necessity of union, in six months there would not be one division of the State without its Agricultural Society. To speak of the salutary operation of such a state of things is not my present design, but to the specific purposes we should aim to accomplish, I would briefly advert.

Suitable premiums for success in the various departments of agricultural labor are now universally conceded to be a powerful incentive to enterprise. Hitherto these have been mainly awarded, and frequently solely confined to the exhibitions of the best animals. So far as our own State is concerned, at least, it is certainly true of the lower section of South Carolina, In all the Parishes, and many of the Districts, black cattle, sheep and hogs are raised not with a view to be disposed of in market, but as instruments for manuring the land, and supplying meat to the owner. Now, a well fed animal of the common breed will subserve these ends as well as Durhams, Leicesters or Berkshires. The tables of our yeomanry are provided with as good beef, mutton and pork as more northern climes can furnish. In our agricultural exhibitions, mechanical skill and science receive no encouragement; nor, in general, is there but slight evidence in the form of essays or memoirs that the mind is required to take a part in the general proceedings. On sleek and pampered horses and other animals, the eye alone is permitted to rest. It is



here principally that reform is necessary. Allow me, then, to offer to your favorable notice the following modifications, if it be not nearly a total change of the plan, almost uninversally pursued by Agricultural Societies.

1. Premiums for the best animals, and the greatest product of cotton, corn, rice and potatoes should cease to be offered, unless in the infancy of a Society, or in the case of an overflowing treasury. To the development and improvement of the agricultural resources of the Districts; the melioration of the health of its inhabitants; the discovery of the diseases of plants and their remedies; the adaptation of the soil and climate to new crops; the best means of economizing labor and time; the use of improved labor-saving machines; the best mode of resuscitating impoverished soils; the general subject of manures; increasing the facilities of reaching a market: rewards for information on these and other kindred subjects, with the highest of all—the moral and intellectual advancement of the husbandman—would be most profitably and wisely bestowed.

2. At every meeting of a local Society, a few questions to be announced for consideration at the subsequent meeting.

3. The local Societies occasionally to interchange visits and information. Let each invite as many others, as it may deem proper to attend its anniversary meeting, by delegation, who are to be prepared with oral or written answers to such questions as the Society inviting shall have propounded.

4. The State Society annually to submit a limited number of queries of general interest to be answered in writing by its own members, and designated local societies.

5. An analysis of the soils of the State and its staple products, to be made by the local societies as rapidly as their funds may permit.

Such is the synopsis of a scheme to effect that change in our associated labour, at present so barren in useful results. Why should its consummation be deemed impracticable? If we are aware of our true situation; if we believe the evidence of our senses, that our lands are deteriorating, and our income is diminishing; if we are not ashamed to confess, that from ignorance, we are unable to return to the soil, the elements of which it has been deprived; if we know that the tenure by which we hold our property, and which can only be weakened by progressively meagre harvests, is becoming more and more insecure; if, in short, these great and solemn truths are deeply imprinted on the mind, why is it that we cannot harmoniously and permanently unite to assist each other, and thereby place our beloved

home in that elevated position which God and nature designed that it should occupy? This subject I know, has been adjudged to be unexciting; too tranquil for the mental upheavings and moral obliquities of the day. The labourer in the cause should be ready to encounter embarrassments of no ordinary character; he must expect a rigid scrutiny into his private affairs; his pretensions for the station of pioneer to be publicly examined, and his motives, openly or indirectly impeached. If these difficulties be surmounted, and he diligently perform the part assigned him, he must not be surprised to see all his measures crushed, or impeded, by some of those numerous devices which agitate and keep the public mind in a state of feverish excitement. With regard to the ordeal through which he is obliged to pass, and the very delicate and responsible relation he necessarily occupies to society, he will however, find his arm invigorated by the conscientious assurance, that the approving smile of Heaven rests on his humble contributions to the public weal. Of this support man cannot deprive him.

I hold this matter of such importance, that I am persuaded, without the aid of local societies, widely distributed and organized on a judicious basis, but little progress to the goal which the devoted followers of our pursuit struggle so energetically to reach, can be made.—Through the instrumentality of these associations, chiefly, will all suggested changes and improvements derive their value. As powerful as may be their separate opinion in guiding the public judgment, when acting in unison, the effect of their verdict would obviously be more potent and salutary. Let us therefore aim not merely to unite the rural population by means of organized bodies, but to induce these to concentrate their authority and moral influence. The mode in which this can be done, has already been noticed.

3. If increased products may be expected from increased intelligence and concentration of intellectual energy, the third expedient in the plan of developing the resources of the State is the multiplication and improvement of the means of internal transport.

The state of our public roads has long been a subject of very just complaint. That more are needed, and that a radical change in the present mode of repairing them is necessary, seems to be generally conceded. When it is considered, that the surplus products of the agriculturist constitute his profits, the time and expense in getting them to market, are to him, grave and important considerations.—With the remark that the farming out of the public roads would, in every respect, be a better plan to insure their good condition than that



which now exists, I pass on to observe that all other means of intercommunication are rapidly yielding to railways. So great is the excitement on this subject in our own country and a large portion of Europe, that not unfrequently the functions of reason and judgment have been usurped by philosophical reveries and the wildest expositions of an unrestrained fancy. The fault continues to be, not that anticipated results from isolated schemes will not be fully realized, but that every design is faultless, and that effects are expected instantly to flow from measures illy contrived, or systematically defective. In this age of intellectual and physical development, the mental vision, in the matter before us, is obscured by the remarkable success which, in some locations, railways have achieved; or which, under intelligent counsels, they are supposed to be capable of accomplishing. In the delirium of public feeling, the people of the oldest and wisest nations have plunged into speculations—too vast even for national undertakings. The result has been wide spread ruin, which has operated with tremendous force against the industrial pursuits of this country, and especially those of the cotton growing region. If the admonitory warning which the afflictive condition of Great Britain now offers for our guidance, fail to impress the mind with the consequences of a misguided zeal, then it may be that a retrospective glance at our own sufferings, emanating from the same cause, might induce us to pause ere the distressing scenes of by-gone days be again witnessed. The failure of the internal improvement scheme of 1827, and that magnificent and imposing enterprise of connecting by a direct route, the Queen City of the West with Charleston, has been followed in relation to the latter, independent of its moral effects, with a heavy loss to individuals, and with regard to both, involving the State, as security and creditor, in millions of dollars. I scarcely need add too, that, at the very time, when weighty considerations demanded a reduction in the number of Banks, another was erected, though the motive for its establishment ceased with its inception.

We are admonished, then, to act deliberately, warily, slowly.—Begin with the road the most likely to confer private and public benefit; then pause in the work of improvement, or, step by step, let the people continue in their onward movement, as indications of success may seem to warrant. It is not to be supposed, that South Carolina with a sparse population—her alluvial and middle sections generally subject to disease—a want of floating capital—and a greater division of labor, and deficient, as experience would seem to show she is, in that enterprize and energy which necessity creates in poorer agricul-

tural communities, will ever witness the consummation of the extravagant hope of many of her people. It is morally and physically impossible, that the revolution, in its extent and effects, which railways are now rapidly accomplishing in Massachusetts, can be produced in South Carolina.

The condition of the two States, in all that relates to the chief elements of success, is widely dissimilar. Improvements in agriculture, by which the climate is ameliorated and population thereby invited into the State, and the diversion of a portion of labor from husbandry, so unprofitable to many, to manufactures and the mechanic arts, that concentrate population and create demands which the yeomanry alone can supply, are enterprises that must precede and not follow the establishment of outlets for agricultural labor. A line of steam communication between Hamburg and Charleston has been in operation 14 years, yet, except Aiken, not another new village between the terminus greets the eye of the traveller. Summerville remains stationary; Orangeburg on the Columbia road neither increases in population nor wealth; no advancement in the agricultural condition of the adjacent country is observable, and the value of land is not materially enhanced. Between Wilmington, North Carolina, and Petersburg, Virginia, a distance of about 200 miles, the entire country exhibits the same dreary and unprofitable appearance which it assumed ten years ago. Now, in two years, two towns, within a short distance of each other, and with a considerable population, have been erected in Massachusetts, which afford high evidence of the extension of an already profitable business. What power called them into being? Cotton Mills—not railways; though steam is lending its potent aid to insure their speedy and permanent prosperity. Except, therefore, under a combination of the most favorable circumstances, railways do not create wealth, if the expression be allowed, or increase population; but, in eligible situations, they augment the one, and confer innumerable blessings on the other, individually and collectively. The origin of the unprecedented progress in the art of transport over land by the agency of steam, forms indeed one of the most remarkable events of the present age.

The benefits of this new instrument of social and national advancement, vast as we know them to be, will yet, under wise and considerate direction, extend far beyond the ordinary penetration of the human mind. By inciting industry, they not only increase the products of the earth, but enlarge the area of tillable grounds. In proportion to the facility of selling, and the cheapness and expedition of



getting his crops to market, will the producer's exertions be roused into action. Every expedient to render his estate more valuable and promptly to meet the variant demands of consumers, may be expected to be adopted and perseveringly continued. The effect indeed will measurably be the same as that which flows from necessity.— With poverty, if not famine before him, the exertions of man, seem superhuman. It is necessity which has brought up the average crop of wheat in England, from 16 to 24 bushels; which in Switzerland has covered every accessible spot with verdure and remunerating crops; and which in New England has converted a naturally unfruitful soil to one capable of supporting in comfort a very dense population. For the want of a ready access to market, a considerable section of the State has never been tilled; nor perhaps has a single acre in that region been brought to the productive point, which, by ordinary skill, it is capable of reaching. Indeed, in the absence of suitable outlets, the result to South Carolina has been nearly the same, as though certain Districts did not form an integral part of her territorial limits. The agricultural capabilities of Greenville, of Pickens, of Spartanburg and York, if not one-third the State, are unknown, and never can be ascertained until the natural obstacles in the way of their developement, are removed.

Unite by transverse arteries, the northern with the main trunk, and by insuring in this mode for the fruits of industry that security, certainty, and despatch, which steam only can impart, you will in effect enlarge the domain of the State by millions of fertile acres, and to the common stock add the skill and industry of a large class of hardy and independant yeomanry. Of the roads proposed to be built, the one to Greenville, and the other to Charlotte, penetrating as both will ultimately do, into North Carolina, they will largely contribute to the rendering available a part of the inactive capital of the commonwealth, and to introduce into its borders the wealth of another community, abounding in mineral and agricultural resources.— Running through the capitols of populous and rich districts; with termini that vie in salubrity of atmosphere with any towns in our country or of the old world; they will certainly increase, as well as multiply the number of exportable commodities, and stimulate into existence manufacturing interests and other valuable pursuits.— Although these channels of communication, in travel and freights, will never probably rival the Hamburg road, yet as instruments in the disclosure of the treasures that lie embedded in our soil, they will

far exceed it, and in this respect, more effectually advance the public welfare.

The construction of these works, and the realization of the advantages which in a few years they will have wrought, will enable us at a future period to complete the plan of inter-communication which the interests of the up-country so especially and pressingly claim.—Of the moral influence to be expected from those iron ways to our State and region, one remark only, it is mete in this place, that I should offer. Our domestic institutions, it is at length, universally conceded, are in imminent peril. The demon of abolition is abroad, unresistingly extending its influence and encouraged and supported in its fanatical purpose by different centres of religious and political power. Under its black banner 17 of the States of this Union have already rallied, and the national authorities are manifestly preparing to enlist. In this emergency, the duty of the southern States, as far as my subject allows me to express an opinion, is comprised in a line; make slave labor profitable. Among the most certain means of accomplishing this end, open new avenues of trade—multiply by internal transit the sources of wealth, and increase the facilities of inter-communication.

By aiding in these ways the progress of the rural art, and generally the industrial pursuits of the people, you erect new and permanent barriers of safety, and insure union at home. Railways judiciously located, in conjunction with the measures to which I have adverted, and shall advert, will afford a sure guarantee, that the intimate and kind relation which subsists between the black man and his owner, the obligation that the latter owes to the community, and which is due by the aggrieved states to each other, will be so strengthened, as to defy the assaults of secret foes or undisguised rebels.

#### *Legislative Aid.*

5. The last measure to which I shall advert is Legislative patronage. However well directed, may be the individual and associated power of the people, the consummation of their purpose would be procrastinated, if not entirely frustrated, without the assistance of the constituted authorities. While the most conclusive reasons exist why this State should long since have adopted a wiser policy, yet, under the influence of inauspicious counsels, she has negatively, at least, discouraged by her acts, as well as her indifference, nearly every suggested means of bettering the physical condition of the tillers of



the ground. Of the 13 old members of the Confederacy, she has done the least directly to promote the permanent interests of the commonwealth. The rulers of Massachusetts and New York, zealously continue in the multiplication of expedients by which to increase and diffuse the gifts—in the one meagre, in the other abundant—which nature has assigned to their respective countries. The prosperity of each, my personal observation has convinced me, is progressing in an accelerated ratio; and the “Annual Fair,” is one of the many evidences, that to the considerate measures of the law-making power is to be ascribed the deep interest which all classes of their citizens feel in agricultural and social amelioration. The agents that have effected the wonderful change which the husbandry of the middle and New England states exhibits, are, first:—Premiums, paid from a fund, the one half drawn from the public treasury, and the remainder raised by the local agricultural societies; and, secondly, Bounties, granted by the State, with a view, experimentally, to ascertain the adaptation of soil and climate to any desired production. As a return for this expenditure, the societies are obliged to submit to the Legislature, a condensed report of their valuable proceedings, which is published at the public expense, and then widely disseminated among the people. By these means, new labor-saving machines have been invented; old ones improved; agricultural science advanced; the public coffer enlarged; and an inappreciable amount of labor, of time and of money, saved to the toiling multitude.

The adoption of the Northern plan, satisfactory reasons induce me to refrain from recommending. Aid, in another form, however, by our rulers, it would greatly subserve the interests of the rural population to furnish.

1st. We desire to know the number of tillable acres in each District and Parish, and to what crops they are the best adapted; the number actually cultivated; barren or unproductive; the quantity of land in its primeval condition; abandoned; the natural growth and value of the timber; the practicability and expense of draining the swamp lands; the number and value of the mineral manures; in fine, full statistical information by which the natural wealth of the State might be ascertained. Accurate knowledge, indeed, on this head, should be considered indispensable to the legislator. Without it, (general statistics, including returns of population) he cannot adjust and regulate the variant interests of the commonwealth. Why has South Carolina been abandoned by a portion of her planters and farmers? Ignorance of her available resources. By emigration,

exhausted grounds are exchanged for virgin soils that require no artificial nutriment. Could not this object have been attained without, it may be, an eternal separation from home and friends? Put it in the power of the agriculturist of knowing, that as fertile lands and at as cheap a rate, are obtainable in his own State, perhaps in a neighboring district, as in the unploughed West, and but few will elect to dissolve the strongest and most endearing associations that bind man to this world.

2. While companies have been formed for almost every conceivable purpose, the removal of obstacles that prevent lands from displaying their productive power, is still a novel enterprize in our country. Capital has never taken that direction, and yet I know no scheme which would pay the undertaker so usurious an interest as the draining and embanking of some of the swamp lands of South Carolina. That it can be successfully done, even the very imperfect information before me, most fully attests. A survey of these immense tracts by a competent engineer appointed by public authority, is the only mode to excite a spirit of inquiry among the people, especially the moneyed class, concerning their present worthless condition, and their immeasurable value in a reclaimed state. Railways will then expedite the work of enlightening the public mind, concerning the soils of many of these swamps, so obviously suitable for rice and other grain crops, that are assuredly destined in a large portion of the State to supercede the culture of cotton.

3. Again, experiments are the basis of agricultural improvement. Conducted as these usually are, however, but little, if any benefit, ensues. An experiment succeeds in Abbeville, while the same trial, under precisely similar circumstances of soil, manure, season, and cultivation, fails in Richland. The difference in the results is traceable to the subsoil. With a geological map before him, the Richland farmer would have been saved the expense and time incurred in making the experiment. Modes of tillage are obliged to be varied according to the different strata of which the earth is composed. In some soils there is an identity of the materials that form it, with the subsoil upon which it rests; in others there is but little, or none.—Hence a knowledge of the composition and arrangement of the different rocks is alone capable of explaining peculiarities and anomalies which are otherwise unintelligible. Upon the connexion between the soil and substratum depends upon the fertility of the land; its adaptation to the production of certain plants, and the benefit it derives from mineral or organic manures. The discrepancy then, between



the productiveness of any soil and a neighboring field, as determined by experiments, is referable mainly to the substratum and the composition and position of the underlying rocks. Now, as it is known, that the strata succeed each other in a certain order, if they were delineated, a knowledge of the strata, thus easily acquired, becomes the natural and safe foundation of improvement. Geological maps, therefore, if they inform us, as they should do, of all the physical phenomena which influence a country, would be attended with signal benefits to intelligent and inquiring minds. Experiments would produce their full results, and be followed or avoided according to the geological formation of the region where they were tried. Let these maps then, be furnished by the State.

4. All papers of admitted value, emanating from the State or local agricultural societies, should be gratuitously distributed by public authority.\* This is substantially the New York plan. If agriculture be the great business of mankind, and its importance in any community be necessarily enhanced by considerations growing out of its domestic interests, no plan to further its welfare could be successfully executed without imparting corresponding benefits on all the pursuits of society. Unless the cultivators of South Carolina be willing to receive the light which their own associated effort and the labors of the geologist and chemist are so competent to afford, they must continue to reap scanty harvests, under the assurance too, that misfortune will annually be sterner and more inordinate in its demands. Give, then, to the husbandman all the facts and information which every available source is capable of supplying; let the experience of the best practical farmers, and the lessons of the scientific man be thrown broadcast over the land; let the small stock of knowledge which individual minds possess, be concentrated; in a word, seek out every intellectual rivulet, and give it a direction the best calculated to aid in fructifying the soil.

*Means of Improving the Agricultural Resources of the State.*

As increased intelligence, local agricultural societies, and facilities of intercommunication, are the three most reliable instruments in the plan of developing, so they constitute the most certain mode of augmenting, and insuring an advantageous direction to, the agricultural resources of the State. Though, in regard to individuals, the amount

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\* It would be advisable that the papers of the local Societies be put in possession of the State Agricultural Society for its examination and sanction, and by that body be transmitted to the Committees of Agriculture in the Senate and House of Representatives.

of theoretical information is small, yet, by concentration, the foundation is soon laid for obtaining an acquaintance with those general principles on which depends success in this department of knowledge. An agricultural society is a great school in which its pupils, it may be for the first time, know and feel their ignorance of the very rudiments of their calling. It is here they are taught, that the earth has its mysteries, which require a high degree of intelligence to comprehend. It is here that, in the execution of the service self-interest assigns them, they first experience the conviction, that doubt and uncertainty is their only guide, and that by the agency of the mind alone, they can be rescued from their unnatural position. It is here, in fine, they are first induced to read and ultimately digest the mental food which science and enlarged observation have so bountifully set before the farmer. To agricultural associations, therefore, composed as they invariably are of unscientific men, with the addition of a few cultivated intellects, unwilling solely to be led by the wavering lights of experiments, we must chiefly rely for suggested improvements and their practical application.

A railway to an old country is like a turnpike road to a new one. Under favorable circumstances, it unfetters industry, gives free scope to physical and intellectual energy, and converts a wilderness into prolific fields. It is a perpetually existing argument, written in solar characters and comprehensible to the most ignorant, that where discretion presides, the will is alone wanting frugally to supply personal wants and comforts, and perpetuate public advancement.

4. The fourth means of improvement is the culture of the pine land region—comprehending one-third of the State, and the reclamation of the swamp lands.

#### *The Pine Land Region.*

The sandy or pine lands remaining untilled because of their poverty, or which, in the few cases of cultivation, but illy requite the labor bestowed on them, I would divide into three classes, viz:

1st. Soils (and their subsoils and lower beds) of almost pure silicious sand, without cohesion, and thinly covered by stunted trees, whether of pine or oak.

2d. Soils very sandy, but cohering more or less, with sandy subsoil, and which are now or have been covered by pine trees.

3d. Sandy soils on clay or other subsoil, wet through winter and spring—and from their wetness and extreme unproductiveness, of the most worthless character under cultivation.

These three classes of course are not always distinctly separated,



but run insensibly into each other, so that of many soils of intermediate grade, it might be doubtful, whether to assign their place in the first or the second class: or, in other cases, whether in the second or third. Still the general and also the particular character of such soils are sufficiently marked for proper understanding. When referring to them, the soils of each class of well marked character will be held in view.

Lands of these three descriptions, with the intermediate grades, seem to form much the larger surface of all the high and originally poor lands of the lower range of Districts, and perhaps nearly half of the middle Districts, or the next below the falls of the rivers. All are usually deemed barren, or ought to be so held, though cultivation may be attempted, or even continued, in many places. Certainly no portion can repay the cost of clearing and tillage in grain or cotton. But worthless as all are in their natural and present condition, it is only of the first class that I should concur in the general opinion, that the improvement is impracticable—at least for tillage and any ordinary crop. Of the others, every acre by proper means, may perhaps be made of agricultural value, varying between moderately productive and profitable, or both in a high degree.

1. The first class, deemed worthless, may be dismissed with merely their concise description. Such lands of well marked character, are to be seen in the whole extent of Sandy Island, near the Wacamaw river; between Branchville and the neighboring ferry across the Edisto river; along some parts of the former stage road between Orangeburg and Columbia; and on the High Hills of Santee, and other parts of that remarkable range of sand hills. The scanty deposit of leaves from the trees does not suffice to hide the entire surface of the sand; so that when seen at night, the irregular sprinklings of dark leaves, as drifted by previous winds, gives to the exposed patches of white sand the appearance of snow partially melted. The high and extensive Sandy Island, and the range of sand hills higher up the country, seemed to have been raised by the action of the winds along the shore of the ancient place of the ocean, precisely as the sand hills now appear along the present coast. And if the coast were to be up-heaved 100 feet above the present level, leaving bare the present bottom of the sea for many miles in breadth, then we may suppose that the sand hills would gradually be brought, by the operation of natural causes to class first; as would the exposed sandy but firmer bottom become similar to class second. Such indeed, I suppose to have been the original manner of formation, and the causes of difference of these two kinds of soils.

2. The second class is of such "pine barren" as is chosen for most of the summer residences in the lower districts. Such are the sites of Grahamville in Beaufort, Pineville in Charleston District, and many other temporary settlements for health. The almost exclusive growth, is the long-leaved pine, without under-growth; so that objects may be seen at considerable distances over the level surface until the view is obstructed by the great number of the intervening straight trunks of the pines. The sandy and very permeable texture of the subsoil, as well as of the surface soil, facilitates the descent and rapid disappearance of the rain water; by which dryness is secured, and the situations are rendered healthy, unless exposed to noxious exhalations from neighboring localities of different character.

The long-leaved and our common species of pines, (the short-leaved in virgin forests, and the "old field" pine as second growth,) alike indicate the acid character of all lands on which they flourish, or almost exclusively occupy. Hence, they as much indicate the peculiar fitness of the land so covered to receive improvement, and derive the greatest increase of productive power, from the application of calcareous manures.

As the pine growth is not exactly the same, so neither is the degree of sandiness of the soil. On lands in Virginia, not quite so sandy as the "pine barrens" of Charleston district, but perhaps as poor, and with like sandy subsoil; "in no case was the rate of increased product, or of profit obtained, the less because of these serious defects, but generally the greater."\*

It is not meant, says Mr. Ruffin, that more or as many bushels of grain of increased product were obtained from such defective soils, as might have been from others better constituted; but that as much or more per centage on the previous product was obtained, and much more per centage on the capital employed, than if operating on better and higher priced lands.

3. The third class differs from the second in having a subsoil so close as to be impervious to water; so that the excess of the rains of winter cannot sink. Neither can it flow off, because of the level surface. It is removed only by evaporation, which process is rendered the slower, from the very sandy and open soil for 5 or 6 inches deep, which must be filled and glutted with rain before any water can lie on the surface. The land thereby is kept thoroughly water-soaked until late in the spring. The long continued wetness is favorable only to the growth of coarse and sour grasses and broom sedge, and barely permits the existence of a mean and thin growth of pine-

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\* E Ruffin.



trees. The wetness and sourness of the land, and the acid nature of most or all of the vegetable products, concur to impede decomposition of the annual cover that dies and falls. The accumulation of vegetable matter increases from year to year, and with it, and because of it, also increase the acid and antiseptic qualities of the soil, and its sponge-like power to absorb and retain water. In short the soil becomes moorish or peaty, and that quality will continue to increase with time, and the continued action of the producing causes. The rank, though worthless grass which covers such land, with the intermixture of fallen pine-trees, are burned off every year, either by design or accident. These fires at first do not injure the pine-trees, protected as they are by their thick dead bark, which is but slightly burned. But each successive year the fire burns a little deeper, until the turpentine begins to exude. This furnishes new and highly combustible fuel for succeeding fires; and the trees are more and more damaged until entirely killed. Their decay and death give more space and vigor to the grass, more fuel and consequent violence to succeeding fires, until but few trees are left, and sometimes none, on spaces of thousands of acres. There is much land of this kind in Georgetown and Williamsburg districts, which is more or less advanced in progress towards the condition of naked "savanna," of which an immense body may be seen by every traveller on the railway, not far north of Wilmington, North Carolina.

Thus these lands have been brought (or are in progress) to the *prairie* condition, by similar means to those which have produced the vast region of prairie land in the south-western States. The original circumstances of these regions, however, were entirely different. The "savanna" lands of North Carolina and South Carolina are flat, wet and acid, and of course quite destitute of calcareous earth. The "prairie" lands of Alabama, Arkansas, and (as I infer) Texas, are generally dry, of rolling surface and excessively calcareous. But some of these very opposite conditions are alike favorable to the growth of grass, and unfavorable to the growth of trees; and though their respective grasses are as different in kind and in value as possible, they equally serve to feed fires, and thereby to destroy the forest growth. The soil, as its dark color indicates, has enough vegetable matter to make it rich; but notwithstanding is barren, (for useful crops) from two causes—excessive wetness and great acidity. The remedies required are also two; and neither alone will be of the least useful effect, without the other also. Draining must remove the wetness—calcareous manures the acidity. These agents will bring into

use the abundant and now inert vegetable matter contained in the soil, and thus convert to manure and food for crops, that ingredient which otherwise would offer to them more of poison than wholesome nourishment.

The wetness of this kind of land is merely superficial, from the rain water held there by a level surface and impervious subsoil. Of course, surface draining only is needed, and that would be such as could be most easily effected. Ploughing simply (during the dry season) in high beds or ridges of proper direction, which would be more than the proper and necessary commencement of tillage, would be half the labor of draining required. A few cross and outside ditches, also begun by the plough and deepened by the spade, in the lower places, and where most descent of surface was found, would serve for the one great requisite of keeping the land dry. But if relieved of its superfluous moisture and well cultivated, still it would be very unproductive, because of its excessive sourness. The vegetable matter in the soil, though apparently decomposed, is in fact insoluble, and kept so by the antiseptic operation of the acid. Marl or lime would immediately neutralize and destroy the acid, and soon render soluble the before stored-up vegetable matter.

This kind of "pine barren," would be a far more hopeful subject for improvement and subsequent profitable tillage, than the dry pine lands of the second class. The superiority would consist in, 1st, the subsoil of clay, or close texture, near enough to be mixed by the plough with the too sandy soil above; and secondly, in the accumulated vegetable matter brought into use by the application of calcareous manure. The great savanna, in North Carolina, above noticed, is still public property, and may be taken up by any one for 10 cents the acre.—The lands of like character in South Carolina, may be estimated by their owners at 50 or 100 cents the acre. But in truth, in their present condition, they are absolutely worthless. Such lands in lower Virginia, where the value of marl is practically known, are held to be worth from \$3 to \$7 per acre; and by farmers from the Northern States, they are considered wonderfully low-priced.\*

The pine lands of the higher country are of closer texture, and

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\* "If a body of precisely such land," says Mr. Ruffin, "lay adjoining my farm, I would be better pleased to buy it, even in advance of all trial, at \$5 the acre, than any of our lands at their usual low prices. This would be incurring all risks of the feasibility of improvement. If previous experiment had removed all doubts and risks, and the results had established the truth of what is now mere opinion, in advance of all facts, then instead of \$5, such land would be better worth \$10, or perhaps \$20, the acre, before beginning any improvement."



better quality than of the lower districts. In the southern parts of Orangeburg, especially, there exists a very close similarity of the pine lands to such as have been marled with the greatest success and profit in Virginia. The numerous slashes, or shallow wet-weather ponds, which are scattered through that region, are subjects of peculiar value for improvement by these means, after their very easy drainage.

In treating the sand hill division of the State as unimproveable, it is meant for tillage and ordinary crops, and for profit upon such operations. It scarcely can be doubted that they are susceptible of considerable improvement, and perhaps with decided profit, for products most favored by very sandy soils, and especially for grazing.—But to insure this result, the constitution of these soils must also be changed by making them calcareous. If it were cheap enough, from the facility of applying marl or lime to make any such land highly calcareous, there is at least one grass that would flourish there. This is the Bermuda grass, (*cynodon dactylon*) which is highly esteemed on merely grazing grounds; delights in dry sandy soils, and flourishes best in a warm climate.

The pine lands of South Carolina have never been properly appreciated by her people. In affording healthy retreats in summer, and pure and invigorating air at all seasons, even the sterile tracts observable in localities contribute their full proportion of the elements which make up the sum of human happiness. For fencing purposes, for boards, lumber, laths and shingles; for tar, pitch turpentine and rosin—the foreign as well as domestic trade, fully attests the value of the pine; for fire wood, it is emphatically the poor man's candle; its leaves furnish an abundant and valuable material for manure and for medicinal purposes. A cluster of these trees in the immediate vicinity of dwellings is the surest preventive against the infecting element of the atmosphere. They, above all other trees, judicious observers assure us, seem to possess the power not only of attracting and retaining pestilential exhalations, but of restoring a vitiated atmosphere to perfect salubrity and health.

The lumber trade is gradually enlarging. From its productiveness—the vast extent of land which the pine covers—and the reduced and fluctuating prices of cotton—an increase of capital in that pursuit would be most wisely and profitably directed. In consequence of the many uses to which turpentine is applied, the demand for a larger product is annually increasing. The extracting of the resinous property of the pine is now perhaps the most lucrative employment in.

the world. It is the only investment which, in skilful hands, while the interest is paid, annually returns the principal. The natural share of South Carolina in this hitherto underrated business is very large.

*Reclamation of the Swamps.*

Utterly valueless in their present state, for tillage purposes, as these lands are, the poisonous property which they communicate to the atmosphere is a perpetual source of disease and death. If effectually drained and embanked, the soil of the delta of the Nile or Mississippi would not surpass them in fertility, or perhaps equal them in the variety of fruits which they would be capable of yielding. Health too, would probably reign where pestilence now abides. Why then, has an enterprize of such transcendant importance in all its relations, never been a theme of profitable public discussion? The question is easily answered. The abundance and superior adaptation of the high lands for cotton, and the comparatively small expense in preparing them for that crop, was originally the main cause. As often as a field of this character, furnished evidence of deterioration, the axe was put in requisition, and another, new and untried, substituted. This expensive and ruinous process has been carried to so inordinate a length, that the continued cultivation of poor tracts would seem to prove, that in the judgment of the planter, all the high grounds of value had been occupied. If this were true, which I deny, there is no alternative but to restore the productive power of the exhausted soils, or to render available the lands of which one of the elements has deprived us. The latter scheme, it is asserted, is impracticable, as the descent in the swamps is insufficient to draw off the water; and even if practicable, the expense of the undertaking would not repay the cost.—Both of these opinions are untenable. Actual surveys of the Edisto swamps by a competent person, and a close examination of most of the swamps of the middle and eastern sections of the State by another\*, show that, in relation to the former—the least valuable†—the smallest descent in the lowest of them is not less than 3 or 4 inches to the mile, and in most of them from 12 to 18 inches; and with regard to the latter, that the fall is obviously sufficient for the purpose desir-

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\* Mr. Ruffin.

† The swamps on the Edisto, says Mr. Ruffin, from their narrowness—hence requiring extensive embankments—would be difficult to be secured from freshets; and as the Edisto passes through a sandy country, and does not therefore make the same rich deposits as the Congaree and Santee, the swamp lands of that region would be less valuable than the latter.



ed. Concerning the outlay, perhaps it is only necessary to remark, that if the value of the rice lands of the river-swamps and most of our inland swamps, be a correct criterion by which to estimate the worth of the best of the reclaimed low grounds of the State, it would be repaid ten thousand fold, and probably by the product of two or three crops, if not one only. Surely what has been achieved in other regions can be successfully done here, where so many advantages and incentives conspire to aid us. I shall not direct your notice to Egypt, where dykes have converted a morass, 270 miles in circumference, into a vast field regularly yielding two crops within the year; nor to Holland, one third of which has been recovered from the sea by mounds, some of which are 63 feet thick; and where at this time, it is in contemplation to drain Harlaem lake, embracing an area of 1500 miles; nor to India, the river banks of which country are said to be 1000 miles in length; nor China, where two of her finest provinces have been banked in from the sea; nor to Great Britain, where millions of acres of exuberant soil have supplanted the pestilential morass and the quaking bog. To our own country and State, I ask you to look. In the levee at New Orleans, art has effected a triumph over nature, which in its physical and political consequences, is still inadequately appreciated. Where will you find a more perfect work for the purpose it accomplishes than our rice plantations exhibit? The result too of individual energy.\*

To the public, in the absence of data on which to predicate an opinion, an extended scheme of reclamation, appears too herculean a task to be undertaken. If, however, the judgment of scientific witnesses may be relied upon, the difficulties are apparent, not real. A canal in the lowest ground, they maintain, having a properly directed course, though but 10 feet wide and 5 feet deep, if always operating, would gradually and regularly draw off the waters, which, obstructed as they now are, may flood many thousand acres; and there are indeed but few, if any of the larger inland swamps, of which a main canal of double this width, at most, would not serve to remove the surplus, and heretofore injurious waters, and perhaps at the same time furnish good navigation in times of abundant water, if not always.

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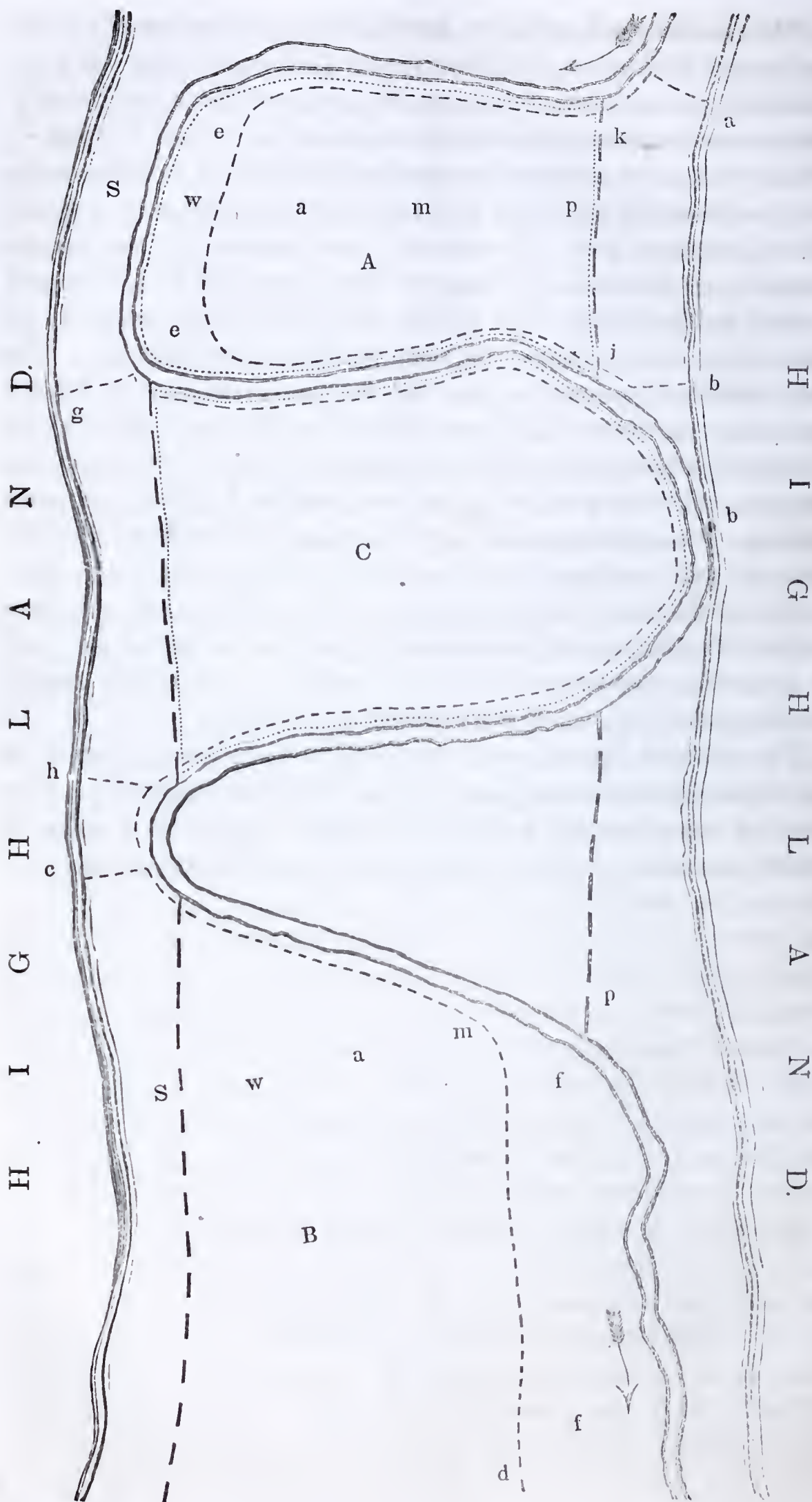
\* The highest evidence of the capacity of individuals of even moderate means to arrest and divert the channel of rivers by stable barriers, examined by the writer, is found in the Parish of St. Stephens. The embankment is  $4\frac{1}{4}$  miles long, 40 feet base and 11 feet high, and was constructed by the venerable Samuel Forcher.—This work will be regarded as an enduring testimonial of the sagacity, skill and indomitable perseverance of its projector. The reclaimed land has produced as high as 70 bushels of corn, and 40 bushels of oats per acre.

It may, then, be assumed, that the drainage of the large extent of high swamp (not subject to tide) in the lower range of Districts, is not only practicable, but would be cheap compared to the immense value to be gained. I have especially in view, however, such swamps as the Biggin, the source of Cooper, and Wassamasaw, the source of Ashley river. It might here be pertinent to add, that all these swamps are underlaid, and at but a few feet below the surface, with the richest marl of our country ; so that the canals deep enough for the main drains would, through nearly all their course, penetrate this rich bed. If a proper estimate were put upon this marl, the expense of excavating the canals, it is not improbable, might be compensated by the use and sale of that great meliorating agent. The construction of the Santee Canal, merely for navigation, and upon a high level, it is now obvious, was an injudicious measure. If that work did not exist, another might be made on a lower level for much the greater portion of the distance, and through rich swamp land with marl below ; and by combining three objects be as profitable as the actual plan has proved otherwise. The two great swamps, already alluded to, are connected, and both very nearly, with similar land on the Santee.—The canals necessary and proper for drainage would completely connect, as well as greatly extend, the navigation of the Cooper and Ashley, and both with the Santee by cutting through higher ground merely for navigation. In like manner the Edisto might be connected with the Ashley ; and, independent of the other advantages, the now difficult and hazardous rafting down the Edisto to Charleston would be avoided, and a shorter and safe passage secured. In the belief, however, that such a work might at some future time, seriously impair the value of, if not destroy, the rice grounds below, the Legislature at its last session, rejected the proposition to incorporate a company to execute it. The general features which distinguish the Biggin and Wassamasaw swamps prevail through most of the swamps above tide water in Charleston District, if not elsewhere. While their drainage therefore, would in effect, add many thousand acres of the very best land to lower South Carolina, it would at the same time execute a net work of canals of almost level and open water. What would be the effect of these extended reclamations of swamps in removing or lessening diseases of malaria origin is much less capable of appreciation. Nevertheless, the opinion is perhaps well founded, that the curse of our State—the only great physical evil—is capable of being controlled by wise legislation and agricultural energy.



The river swamps, subject to inundation by the freshets of the rivers, present a much more difficult subject for improvement. It is on such lands as the Santee, Congaree, Wateree and Pedee, that the only extensive and successful trials have been made to reclaim swamps.—While each of the enterprizing proprietors acts solely in reference to his own land, and frequently in error as to that, and there is no general and consistent plan of operations, it must happen, that one private embankment serves to obstruct some other ; and if all were to attempt to bank out the floods, their height and force would necessarily be rendered so much the greater, and perfectly uncontrollable. The plan heretofore pursued by the undertaker is to embank his swamp land along the river side, as near as may be. If, then, the work be completely effective for his own purposes, still he has obstructed the passage, and thereby more or less increased the height of all future freshes. Should his opposite neighbor deem it advisable to follow his example, and both their dykes approach near to the river side, then, instead of the floods having a breadth of two or three miles of swamp to flow over, they would be confined to the narrow bed of the river. It is manifest, that the opposed water would rise, until high enough to surmount or sweep away the obstructing dykes.

The annexed figure presents what are not uncommon features of the Santee and our other great streams. The river, pursuing a very crooked course through a bottom of swamp, from 2 to 4 miles in width, at ordinary height, is only from 100 to 200 yards wide.





Suppose the proprietor of the body of swamp A, determine to improve it by embanking. He may succeed, either by completely surrounding the main body with a dyke, (as indicated by the medium dot line,) extending from the high land at a to b, or, as in the body B, by an incomplete embankment, (c to d,) which, by its great extension downward the course of the river—the rapid rate of descent of the river, and the usual short continuance of the freshets, serve generally to fend off the pouring floods, and protect the upper parts of the embanked swamp. The latter is Major Porcher's plan; the former, that of Col. Hampton, and most others. But it is an obvious condition of success in either case, that there shall be left without the circuit of the embanked land, enough breadth of swamp for the passage of the floods, and this omitted space must be next the river side, (as e e and f f,) which is usually the highest, easiest to embank, and safest for tillage; but the worst, because of its high elevation for the discharge of the freshets.

But suppose, by using proper safeguards, (there being enough unembanked swamp to allow the discharge of freshets,) that both these separate improvements are as successful as possible, afterwards, the proprietor of the intermediate body C (separated by the river from both the others,) chooses to exercise his equal right of embanking his swamp, and from the success of his neighbor, is induced to carry his dyke still nearer to the river's edge, on the highest and best ground, (as g to h.) I need scarcely say, that the more effectual his work, the more certainly it will destroy the others, by raising the inundations to greater than any former height. In relation to the opposite banks, the skill of their architects will be found utterly ineffectual in restraining the still increasing height and violence of the freshets. It is as clear, that every successful isolated work of this kind, however valuable in results, considered alone, is a great obstacle to similar operations, and destructive of any general and complete improvement. Another scheme, requiring, however, legislative action and control, might be more cheaply and efficaciously prosecuted, as follows: suppose the whole in a state of nature, or no embankment made; the swamp lands of various heights above the ordinary height of the river—highest, as usual, nearest the river, and lowest near to the high land—and all subject to be overflowed to greater or less depth by the freshets. Suppose, further, that the locality offers swamp enough to be worth embanking on any existing plan of procedure. The first operation of the tract A, would be to dig a good open canal from i to k, (the line indicated by long marks,)

nearly parallel to, and 300 or more yards from, the high land. The earth would form a dyke on the opposite side, (as represented by the fine dotted line,) the dyke would be continued around, along the river, and as near it as convenient, taking earth from the river margin, but leaving there no open canal or channel for a current. The stretch along the canal would require to be high, because on the lowest ground; but the remainder, and much longer portion of the surrounding dyke, would be on the highest ground, requiring least height and expense of embankment. The canal, and the width of low swamp left along side, with the original bed of the river, would furnish ample space to pour off the freshets. Should a more ready discharge be required, the floods would make the canal deeper or wider, by the increased velocity given to them by a straight course. If there was superfluous space left, the water would there deposit alluvium, and thereby raise the surface, ready for future embankment. So far as to a single operation. But the advantage would be increased by every extension by similar works, and each one would greatly assist, instead of obstructing, the others. Thus, suppose the general plan to be continued 40 miles and more down the river, then, besides the original bed of the river, there would be on each side of the whole body of swamp, a nearly straight and open canal, (as shown by the long space lines and connecting parts of the river,) through which far shorter and straight courses, the water would flow with double velocity. Such canals, pouring through the lowest parts, if only 20 feet wide and 5 feet deep, would discharge more water than the breadth of a mile of swamp, obstructed by standing and fallen trees, &c. The passage off of a freshet, which would otherwise have risen, say ten feet above ordinary water, in half the time, would be equivalent to keeping down half its volume and height, or preventing its rising more than 5 feet. The same amount of alluvium, (perhaps more, by washing,) would come down the river; but by being conveyed through the lowest grounds, instead of deposited where the highest land now obstructs the floods, and where every deposition increases the obstruction, they would settle where it was most needed to raise the surface.

The operation of this plan would be to aid and be aided by nature's working with the floods, and never to counteract her labors.\*

I now ask your attention for a few moments to the improvements in progress in a sister State, and the mode of accomplishing them.

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\* For these views, professing, as I do, to be in practice but slightly acquainted with the subject, I am indebted to Mr. Ruffin.



The School fund of North Carolina, besides bank and other stock, yielding an annual income of \$100,000, embraces all the swamp lands of the low country, which had not been granted away prior to the year 1825. By a statute of that year, a beginning was made in providing for the support of a system of common schools, and as a portion of the means for this object, all unappropriated swamp lands were granted in fee to the President and Directors of the "Literary Fund."\* The drainage of the swamp lands, as a part of a general scheme of internal improvements, was undertaken in 1836. The sum of \$200,000 was then set apart, to be applied by the Literary Fund in draining any of the lands held by them under the grant before mentioned. The cost of the whole operation was a little exceeding \$172,000, or an average of \$2 64 per acre. The minimum price fixed for the timbered land is \$15 an acre, and \$5 per acre for the savannah. For timber alone, these lands, which in their natural state were estimated at from 10 to 20 cents an acre, are now worth the money the Board of Commissioners have put upon them. In this brief statement of the wise and patriotic labors of another State, are embodied two facts, among many others, highly instructive and important. It is now positively known, that a certain description of worthless swamp land, of which the quantity in South Carolina is large, can be put in tillable order for less than \$3 an acre; and that in its reclaimed state, its value, at present nominal, would be augmented several hundred per cent. Secondly, that North Carolina—not distinguished above the other Southern communities for her activity and zeal in the career of mental and physical amelioration—has devised and is progressing in the execution of a scheme, by which, by a single operation, intelligence to the mind and health to the body are secured, and millions of acres of great fecundity, in effect, added to the territorial limits of the State.†

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\*"The Literary Fund," says Gov. Graham, in his letter to the writer, "is a public corporation, consisting of the Governor of the State for the time being, and three Commissioners; and is charged with the superintendence of the school fund, and the general administration of the system of common schools."

†"I saw land in Beaufort county reclaimed, which had often been three feet under water, producing from 10 to 16 barrels per acre, with other crops in the greatest luxuriance. This land, before reclaimed, was offered for 25 cents an acre, and no purchasers found. After deducting the expenses of cultivation, it will pay the interest of six per cent. upon about \$2 50 per acre. The cost of cutting down and clearing the land was about \$14 per acre. It will now rent for \$10 per acre, annually, with the taxes paid." Extract from the Report of A. Nash, Engineer to the Board of Internal Improvement for North Carolina.

Suppose \$210,000 to be appropriated by South Carolina to purchase and reclaim, at \$3 per acre, 70,000 acres, and that the improved land be sold at the average price of \$10 per acre. If the work be accomplished in three years, after returning the principal with legal interest to the Treasury, there would remain \$485,590, the interest on which (\$33,991) would yield an amount equal to that, or nearly so, annually expended on account of Free Schools. Should, however, a part of this sum be annually set apart as a fund to prosecute the plan of internal improvement, the time would probably soon arrive when fertility and health would reign where barrenness and disease now exercise resistless sway. The sectional character of the enterprize is the prominent objection to its execution. It should be remembered, however, that the amount taken from the public purse is only borrowed, and that when refunded, the State will not only have received for its temporary use the legal compensation, but property estimated to be worth at least 200 per cent. more than the principal and interest of the sum disbursed. Further, our people would forever be relieved of the pecuniary burden which the sustaining of a highly unsuccessful scheme of education imposes upon them. Unlike her neighbor, South Carolina owns no portion of the swamp lands. She has therefore to determine, whether property in private hands, now a nuisance of great and increasing magnitude; might not, by public authority and at the public expense, be made to produce results equally beneficial to the commonwealth as the immediate section of country where the ameliorated change is effected.

The whole matter is one of peculiar interest to lower Carolina, and for its settlement it may yet become necessary to enlist the mental aid of all who can rightly appreciate the extent of the good or evil which improved or neglected husbandry is capable of producing.

With regard to many of our inland swamps, and generally the low grounds of the State, the soil of which has been used as an element in the composition of manures, the intelligent farmers are fast yielding to the opinion, that it is in every respect better to abandon that practice, and to render these valueless tracts available capital, by drainage and appropriate earthy or mineral ingredients.

Most of the inland swamps of South Carolina are of inexhaustible fertility. While the soil is generally a black mud, averaging, probably, three feet in depth, sometimes ten, and rarely under two feet, the substratum, with few exceptions, is sand and gravel, on which account it is more easily drained and kept from water, though it is susceptible of perfect drainage, when resting on clay, if it be a foot



or two feet below the surface. Between the seaboard and Columbia, thousands of acres, but inferior in productive capacity to similar tracts immediately below the Falls of Savannah river, are to be seen in the cypress ponds, bay galls, and creek swamps, which cover, perhaps, half the State below the ridge. The experiments of our most enterprising planters go far to establish the belief, that these lands, or the better class of them, are capable of yielding average crops, including the first year, for an indefinite period, of 400lbs. of *clean* short cotton per acre. The cost of bringing them into cultivation, may be estimated from the following statement: By one individual,\* from 150 to 165 acres were last year put into tillable condition, at an expenditure for drainage of 1733 days work, to which he afterwards probably added 66 more; and for felling timber, burning, fencing, &c., 6,813 days work of all sorts of hands. Under different circumstances and management, it is believed, that 1000 days of ditching, and nearly 5000 days of work of all hands, could have been saved; in a word, that such land may be prepared for the hoe, at a cost, in labor, of \$25 per acre.† Manuring at the rate of from 2 to 300 bushels to the acre, would of course add much to the expense. With such encouraging facts before them, it is almost unnecessary to observe, that if our people, especially those of the lower country, would embark, each according to his circumstances, in draining, clearing, and marling this emphatically pestilential region, they would do more to develop the agricultural capacity, add to the wealth, and improve the health of the State, than by any other application of their labor and time.

Although private enterprise is supposed capable of accomplishing much, on this head, yet, in relation to the river swamps, it would be comparatively powerless. Where the concurrence of many wills is required, and landed property, from the operation of our laws in regard to intestates, is constantly changing owners, or multiplying their number, the difficulties of united action are almost insurmountable. If legal aid could be so far brought to facilitate the undertaking, as to produce uniformity, in order that the labors of one should not counteract those of another, a very formidable impediment in the way would be removed. To require and compel the combined action of proprietors, would constitute a more decisive act on the part of the legislature, that could not, however, be dispensed with. In the code

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\* Ex. Governor Hammond.

†The grubbing was not included, as it belonged to the crop work.

of Louisiana, where such a power is given, the most signal benefits to individuals and the public, have already accrued from its practical exercise.

6. Another means of agricultural improvement consists in diversifying the industrial pursuits of the people.

The first question which this interesting subject presents, relates to private surplus income. In what ways is it annually disposed of? Partly, it is true, in enlarging the sphere of business in which the citizen is engaged, but perhaps more generally in other modes, if advantageous to individuals, of no essential practical benefit to the public. Without reference to other occupations, the agriculturists of South Carolina have become bond-holders and stock-owners, in despite of the kindest and unceasing protestations of nature. The mental tranquility and independence of the countryman have been exchanged for the restless anxiety of the city inmate, and subjection to irresponsible power.

The uncertain and wavering counsels of experience, by which alone they are led, have for many years induced a large portion of the planting community to abandon, in a measure, their calling, and to aid the moneyed class in their schemes of adventure and speculation. Hence, Banks have multiplied beyond the requirements of society, and the high rate of interest on money lent, continues to exercise its malign influence. As long as the profits of the husbandman, whether from the want of a market for his products—the supply exceeding the demand—ignorance of his business, or sloth in its discharge, or any other cause, fall materially below other investments of capital, he very naturally turns to those means of revenue, which, requiring no physical or mental labor, produce an income ample, and, in general, certain. From this cause have arisen pernicious results, of the extent of which, but few have formed an accurate judgment. To be aroused to a just sense of his dangerous position, the agriculturist must have the evidence of his own senses; he must see and feel that to attain the goal which every human being should zealously struggle to reach, the unceasing exercise of his power is imperatively demanded. Whenever satisfied that he can quickly sell whatever he is enabled to grow, at remunerating prices, and that a higher exercise of his energies will be proportionally rewarded, then, it may be expected, that the fruits of his industry will be wisely and economically appropriated—his loans be recalled—his bank stocks returned to their own proper owners, and he once more assume the station which Providence so manifestly designed that he should occu-



py. The capital of the State, so far as it affects agricultural advancement, is practically unavailable. Open the door, which incorporated moneyed institutions, the want of legislation, and minor causes have unitedly so long closed, and capital, at least that portion of it which belongs to the rural population, will at once obey the laws which art as well as nature not unfrequently establishes in every society. The effect of so radical a change would be to enlarge the boundary of the farmer's legitimate work ; to give a new and wholesome direction to agricultural capital ; and to encourage and sustain those pursuits without whose active aid his vocation would be utterly unable to fulfil its high destiny. The prosperity of agriculture is indissolubly connected with that of commerce and the arts. How, then, may the wealth and success of *this* State be the best promoted ? By the culture of a single product of the soil ? No ! Exclusive devotion to strictly agricultural duties ? Far from it. To the merchant—the manufacturer—the mechanic, we must extend the right hand of fellowship. Each is dependent on the others, and to be able fully to appreciate the onward progress of one another, is to be certain that all the elements of society are working together harmoniously and beneficially. Why is Charleston being deprived of her share of foreign commerce ?\* Why have the mechanic arts been expelled the State ? Ask the cultivators of the soil, comprising nine-tenths of the inhabitants of South Carolina. Maddened for a quarter of a century by the golden harvests which a delicate shrub had spread before them, they have become men of one idea, and seemingly forever incapable to comprehend the plainest principles of domestic and political economy. Still enveloped in the dark cloud of delusion, they practically persevere in the belief, that in cotton and their unaided powers, temporal bliss alone consists.

If our metropolis were the *entrepot* of variant products, a vessel reaching her port in ballast would be unknown. As a general truth, agriculture advances in proportion to the extension of other branches of industry. As the demand for the products of the soil increases, every means to supply and profit by it are promptly resorted to. Its effects in skill, industry and enterprize are immediate and powerful. The

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\* The foreign commerce of Charleston is obviously declining. The North, by the aid of steam, can supply the South with European goods, in one-third the time that it takes the sail vessels of the latter to cross the Atlantic. To prevent our metropolis from becoming a mere colonial port of Massachusetts and New York, a line of steamers to England and France, it will be absolutely necessary to establish.

enlargement, therefore, of our foreign commerce and domestic trade, depending as it primarily does on the successful tillage of the diversified fruits of the earth, is to the agriculturists of South Carolina a matter of immeasurable importance. The necessity and policy of manufacturing the raw materials of the State are at length perhaps universally conceded.\* The mills now in operation, and in the progress of erection, afford the most satisfactory evidence, that dependence on the North for certain indispensable articles of clothing, is slowly, but steadily diminishing. The value of one division of labor, however, still remains unappreciated. The mechanic art, from the limited range it has so long occupied with us, would seem to have been designedly neglected. Perhaps in no quarter of the Union have the elements been subjected so little to the control of man.—Manual labor continues largely to occupy the place of machinery. This is the true reason why the northern mechanic can undersell the southern workman in his own market. The latter relies mainly on physical human energy; the former on fire and running streams. The one, though in every section of the country most prodigally supplied with wood and water, measurably neglects to seek the aid of either; the other, stinted in these natural gifts, secures both in utter disregard of expense.

Another difference between them remains to be noticed. The Northern mechanic, like all of his fellow laborers of that region, whenever he may reasonably calculate on future recompense, willingly submits to present loss; his actions are guided rather by circumstances undeveloped, than those passing before him. The Southerner on the other hand is unwilling to move, unless positively assured of speedy and ample remuneration; he incurs no expense until the interest on his outlay enables him to do it without a risk. If possessed of sufficient skill, which no one doubts, and capital alone be wanting to enable the southern mechanic to occupy the vantage-ground, let our moneyed men provide it. He who would supply from his domestic work-shop the implements indispensable to the wants of the husbandman, and generally such articles as the necessities and comforts of society require, would be a benefactor to the Commonwealth. Why not create societies in this State, to diminish manual labor in reference to the more important avocations of the

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\* There are 15 cotton mills now at work, which vary in the number of their spindles and looms—the former from 264 to 6000, the latter from 10 to 400. The number of iron mills is three, of which two manufacture iron, nails and castings, and one, iron and castings. A woollen factory is unknown. Why?



citizen, where every element of success lies before us? Associations not only for moral and mental advancement, but for the purpose of uniting skill and capital to augment and extend the business of each, have long been demanded by the merchant, the manufacturer and the mechanic. Their existence in South Carolina would furnish conclusive evidence, that every department of industry had consulted its true interests, and would receive its legitimate reward.

7. To restore the fertility of our exhausted grounds by deepploughing, thorough draining, and high manuring, including a judicious rotation of crops. Where these three operations are judiciously performed, the land is in the best possible condition for present profit and permanent improvement.

#### *Deep Ploughing.*

The differences of opinion concerning the advantages of sub-soil ploughing, have arisen mainly from an unacquaintance with the chemical effects produced by the Deanstonizing system of tillage. The sub-soil by its action is not displaced, but only broken or pulverized to the depth of from 14 to 20 inches. After the lapse of a few years, the disturbed understratum may advantageously be brought to the surface, for it will be found sufficiently friable and fertile to be incorporated with the upper soil. By this plan the land derives a three-fold benefit. It enables the roots with their minute and delicate fibres to penetrate the ground a much greater depth, and thereby to avail themselves of any decomposing matters, or earthy ingredients, which the substratum may contain; the soil becomes permeable by the atmosphere, by which an increase of oxygen gas to the roots is secured, and a larger supply of moisture from the atmosphere, as well as earth, obtained; and again, an increase of temperature is the necessary result of the admission of air to the soil, which of every description is a bad conductor of heat, though in different degrees. The advantages of a deep and well pulverized soil, indeed, cannot be over-estimated. Every operation in husbandry is thereby benefitted and cheapened. Less seed and less manure produce their full effect, and the chances of a good stand are greatly increased.

By shallow ploughing, not only none of these desirable results accrue, but the soil itself performs only a part of the service nature designed it to render. When land is therefore said to be exhausted, it may be literally true of a few inches of its surface, but the remainder, untouched by the plough, would certainly contain all the elements of fertility which at one time distinguished the cultivated portion. The absence of trees, and even vegetation is therefore no positive guide in

reference to the unproductiveness of the soil. It is well attested that lands in so poor a condition as to be unable to return the seed sown, have, by the subsoil plough, unaided by manure, been converted into highly prolific fields. The secret lay in the effectual breaking up of the substratum, which, below 4 or 5 inches was so hard as to be almost impenetrable to the pick axe. Even on light sandy soils resting on clay, from the final intermixture of the two earths, deep ploughing insures the most marked improvement. The soils resulting from decomposed trap rock, like the flat woods of Abbeville, are some of the best in the State. As trappean rock, contains 10 per cent. of calcareous matter, the use of the subsoil plough in rendering it available seems imperatively to be demanded. It may in fine be remarked, that without the assistance of this implement, scarcely any soil, especially stiff clay soils, or land with a clay substratum, can be made to exhibit their full productive power, or to rival in fertility the best natural land of the country.

#### *Drainage.*

The soil is composed of the detritus of rocks. The more simple the constitution of the mineral from which it is derived, the less is its power of imparting productiveness; on the contrary, where the materials are drawn from different strata, the elements of fertility are proportionally augmented. The agricultural capabilities of a country are therefore intimately connected with its geological character. The value of a soil does not solely consist in the mechanical support it gives to plants, and providing the chemical elements which they require, but it is materially affected by the condition of the ground in relation to drainage.

To put the land in the best order with regard to any superfluous moisture is one of the first and highest duties of the husbandman. It should precede every other operation, for it is the basis of all improvement. In England, where from necessity agriculture has reached a state of advancement unknown in this country, the expense of drainage is the most difficult point to be determined between the landlord and tenant with a view to profit and the progressive productiveness of the farm, it is readily and wisely conceded by both, that the artificial dryness of the land is indispensable. To the want of knowledge on this subject, involving, as it does, some acquaintance with geology, and the laws of engineering and hydraulics, one prominent source of disappointment in our annual returns may be found. In no location is it systematically pursued. Everywhere it is obviously deficient in the means of securing an end. Drainage, it is almost unnecessary to



remark, is to wet lands, what manure is to high grounds. By the one, the natural nutriment of the soil is rendered available; by the other, the want of appropriate pabulum is supplied.

Although water is the great conductor of food to the vegetable creation, yet where it stagnates or is in excess it is a fatal poison. It checks perspiration; perhaps neutralizes substances which afford nourishment to plants; prevents the circulation of air through the soil and reduces its temperature. It moreover renders manure of every kind, whether putrescent or caustic, wholly inoperative; nullifies all attempts at pulverization; and converts grasses of aliment into herbage coarse and innutritive. In the language of Mr. Stephens (in his "Book of the Farm") "burning land requires draining as well as soaked land, because drains will supply moisture to the former in summer, while it will, under the latter, dry in winter." Whatever, therefore, may be the elevation of the ground, if level, it should be prevented from absorbing the entire quantity of water which descends in showers. To render the operation of drainage effectual, winter is the proper season for its accomplishment. "The wetness remaining in and occupying the pores of the soil and of the subsoil all winter, render the soil so cold, that most of the summer's heat is required to evaporate the superfluous moisture out of it; and in the very progress of drying by evaporation, the heat is dissipated that should be employed in nourishing the crops all summer."

Many of our soils suffer much from stagnation of water upon an impervious subsoil. This is particularly true of the black jack lands of Chester, than which there is perhaps no district in the State that would be so materially benefitted by the judicious use of the spade. This great agricultural improver, under intelligent direction, would not only render more productive the lands under cultivation, but would immediately bring into profitable tillage vast tracts of inappreciable value. The levelness of the ground, we are assured on high authority\* constitutes the only difference in relation to fertility between the lands of Chester and Abbeville, yet, while the original forests of the latter are very limited in extent, there is believed to be more land in a state of nature in the former than distinguishes any other division of South Carolina. The supposed difficulty and expense of drainage, or it may be, an imperfect estimate of the importance of a dry soil for all tillage crops, constitute the main impediment to be surmounted. On this head, it remains only to be said, that if the in-

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\*Mr. Tuomey.

telligence of the farmers of that naturally highly famed region were directly consulted, this apparent obstacle to a more extended and successful culture of the District would prove to be a feeble barrier.

Of the two causes of excessive wetness—stagnant water and springs exuding it to the surface—the latter is the most common. In abatement of their injurious effects, two means somewhat dissimilar, are resorted to. While surface draining may be effectual in the one case, under-draining and tapping are indispensable in the other.—The immediate cause of a redundancy of moisture is first to engage the attention of the tiller. The soil, subsoil, climate and crop are also points to which his mind must revert to arrive at a correct conclusion. Though, where land is so abundant and cheap, and where profit is so easily secured, it is not to be expected that we shall resort to the augur, the pump and the steam engine, yet no economical means should be unessayed to attain the great object in view.—The principal design of a drain is not to carry off water but to draw water towards it in every direction. The fluid should be kept perpetually circulating and descending, or diminishing in bulk.—Where this is done, full compensation for the outlay incurred is retained, and the two-fold object of rendering our homes more salubrious, and our fields more fruitful is secured. The capital of the farmer moreover annually increases in value. This is the great paramount advantage of all. In effect, the area of his lands is enlarged, and his profits rendered more stable.

#### *Manures.*

This is so vast a subject, that the limits assigned me forbids that I should take any other than a brief practical view of a few of the means nature has kindly provided to resuscitate our impoverished fields. I shall pass by unnoticed the putrescent manures so universally resorted to, with the single remark, that to apply them successfully, some acquaintance with the principles of scientific agriculture is indispensable. As long as the farmer and planter permit themselves to grope in the labyrinth of doubt and uncertainty, disappointment, expense, and a most unprofitable expenditure of labor, may be expected to continue. The actual money lost to cultivators in their blind efforts to fructify the ground in a manner adapted to the requirements of their crops, would perhaps have been enough in every civilized country, if retained and unexpended, to class a large portion of its population among the millionaires of the world. Marl, lime, peat, and pond mud, are some of the elements which have not been used as extensively as their intrinsic value merits. While lime is to



be found only in a few locations, yet, the supply is supposed to be adequate to any demand which may be made upon it. Marl exists in inexhaustible quantities, and is moreover widely diffused throughout the lower country. I shall not, in this place trespass on your patience, by an attempt to show that calcareous manure in some form, is indispensable to the fruition and development of plants, and that nearly all of the soils of our State, require its application. If the elaborate writings of that devoted agriculturist, Edmund Ruffin, has not satisfied the reflecting observer on this head; if all his resistless facts and reasoning are to be set at nought; if in fine, the profitable career of the Virginia marler, and a few of his disciples in South Carolina, fail to arouse the slumbering energies of our yeomanry, then surely nothing that I could advance would be sufficient to awaken and diffuse the belief, that the calcareous matter with which our State is so prodigally furnished, was placed there by the Diety, for a wise and beneficent purpose; and not, as our practice would disclose, to gratify the mental speculations of visionary dreamers. Immediate and large returns from a single application of this material, is almost universally expected. Disappointment ensues. To disclose its true, a thorough intermixture with the soil must first take place. As this is rarely effected the first or second year, the time and labor devoted to the trial, are considered as having been uselessly expended, and a repetition of the experiment is of course abandoned. The contagion of example spreads, and the marl and marler are alike denounced for their supposed worthlessness. The sombreness of this picture has, however, been measurably relieved by the unbending perseverance of a few believers in the necessity of intellectual illumination, as applicable to the farmer and his calling. In full possession of the principles which should guide them, they have permitted no obstacle to interrupt their progress, and the most ample reward has crowned their efforts.\*

#### *Peat.*

The regular peat formation of geologists is not to be found in our country, a substance, however, very analagous to it exists in this and other quarters of the Union. Our salt marshes, especially on the lime where the fresh and salt waters commingle, and many inland swamps are composed of deep rich beds of vegetable remains in a state of greater or less decomposition. The putrefactive process having reached a certain stage, the influence of the tannic acid prevents its

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\* "Since I commenced maring, five years ago," says Ex-Governor Hammond, "the productive capacity of all the land I plant has been *doubled* by it."

further decay. Of itself, peat is deficient in fructifying power; but when combined with other elements, it forms a fertilizing compound of great value. Independently of the tannic acid, resulting from the changes which the plants composing it have undergone, peat is wanting in azote and appropriate in organic nutriment. To neutralize the one and supply the others, are objects to be attained by the agriculturist.

It is an interesting fact, that the proportion of water, salts and geine, in peat, and the excrements of the cow is very nearly the same. The ammonia of the latter mainly marks the difference between them; hence, to make the one equal to that of the other, the addition of alkali, at the rate of 1 lb. of potash to 100 lbs. of fresh peat is alone necessary. In Great Britain and this country, it has been ascertained, that one load of cow or stable manure, when thoroughly incorporated with two loads of peat, is equal to three loads of pure stable dung. Before the intermixture, it is important that the turf should be drained of its moisture. By exposure for weeks to the sun and air, not only this purpose is effected, but the water itself is deprived in part of its noxious astringent irony quality, so injurious to vegetation.\*

The object of the application of animal dung.† abounding in alkalies and azotized matter, to peat and peat lands, is to neutralize deleterious acids, and supply the deficiency of nitrogen; and lime to furnish them with an earthy substance, which they lack, and to dissolve and render pliable the turfy matter.

It is known that, as a first crop, the cereals do not thrive well on the peat soils of Europe. Potatoes are first planted, and the crop is followed with peas, then turnips, oats, grass-seeds and wheat.

In the reclamation of peat soils, drainage is first to be attended to. One ditch 6 feet deep is better than 3 ditches three feet deep. The primary object is to sink them beneath the peat. Next break up the ground thoroughly with a subsoil plough, then broad-cast with marl or lime.‡

#### *Pond Mud*

The slushy material found in low places, and in the bottom of ponds, when dry, composed as it is of the washings of the high land, seldom contains more than 20 per cent. of geine. If possible, a pond should never be allowed to remain unproductive capital.

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\* The drier the peat, the less animal manure required.

† "A dead horse has converted 20 tons of peat into manure, richer than stable dung."

‡ Of the causes of unfitness of bogs for cultivation—stagnant water, and inert vegetable matter—burning furnishes a simple mode of removing the latter.



Where circumstances forbid drainage, the admixture of the soil with putrescent manures, constitutes a valuable compost. Like peat, it must be freed from its acidiferous principles with lime or marl. All indeed, that has been said of peat, and peat lands apply with equal force to the fens of the State, of which the number is very large, and in places of considerable extent. Either, then, for the purpose of reclamation, which in general can be easily and economically accomplished, or as providing a material for an enriching compound, these now noxious tracts should no longer be considered as depreciating the value of any estate on which they may be found, but as a fund capable of returning a profitable interest.

For the purposes alluded to, the value of peat and moorish lands is practically known only to a few of our cultivators. Those who have used the soil of either, incorporated with stable litter as manure, bear the strongest evidence to its fructifying power.

#### 8. *The Establishment of Sheep Walks.*

A distinguished farmer of New York, in a series of letters addressed through the Farmers' Library, to a prominent member of this body, has presented facts and considerations on this subject, of deep interest to a large portion of the agricultural community of South Carolina. The whole matter, indeed, has by him, been most ably and elaborately discussed, and the conclusion at which he has arrived appears irresistible, that this State possesses all the elements by which sheep walks may most profitably be established, and through their agency our exhausted soils quickly and permanently meliorated. It is a fortunate coincidence, that while the cotton culture is gradually relaxing the grasp which it has so long held on the minds of our rural population, the most powerful incentives to the adoption of a new line of agricultural policy are beginning to exercise their salutary influence. It is now evident that these will soon effect what the power of arguments and the most stubborn facts would never perhaps have been able to accomplish. That one-third of South Carolina, embracing the most northerly section, requires the abandonment of cotton as a crop, and the substitution of other products, and the diversion of a part of its agricultural capital to other pursuits, seems at length to be generally admitted. The two first of these purposes, it is confidently believed, will be fulfilled by sheep husbandry, which of all other means, if there be any, of restoring land to its condition of native fertility, is the quickest and most certain. As the introduction of new and cultivation of native grasses, rotation of crops, green and animal

manuring, and other kindred questions, are involved in the subject before us, each in its turn shall receive special notice.

That climate is not adverse to the health of sheep, we have the most abundant evidence. In our own country they are profitably raised as far south as 29 deg. north latitude. The sheep of the Atlantic coast of the southern States, whether they graze on the scanty herbage of the pine ridges, or the vegetation on the margins of swamps and stagnant pools, seem unaffected by the salubrity of the one, or the miasmatic vapors of the other. The mutton of the Parishes of our State, in fatness and delicacy of flavor, is equal to that the same breed in the middle or up-country.

That low latitudes affect injuriously the wool-bearing properties of the sheep, appears to be undoubted. While their tendency is to impair the fineness, the most valuable quality, the length and softness of the fibre, are, however, increased. The latter properties result exclusively from the abundance of green and succulent herbage which is afforded them the larger portion of the year. As food is productive of such effects, it is maintained that, all other circumstances apart, whenever sheep are kept in a thrifty condition, or wherever intelligent breeders exist, the quality of the wool may not only be preserved, but improved in length and fineness. The preservation of the Merino race, says Mr. Randall, in the marshes of Holland, at the Cape of Good Hope\* and in Australia,† and our own country, establishes the truth of this position beyond controversy. From this among other facts, and the testimony of the most experienced and well informed wool-growers, it appears that the influence of temperature on the fineness of the fibre may be counteracted by skilful management and judicious selections in breeding.

In a competition with the West in the raising of sheep, there are considerations which operate in favor of the South.

1st. The lands of this region adapted to sheep walks, are as cheap as in the West, and may be bought in Greenville, Spartanburg and Pickens for \$1, and even 50 cents per acre. Extensive tracts in our pine lands too, where sheep increase rapidly, there is no difficulty in obtaining at a very low rate.

2d. The mildness of the southern winter enables the farmer to give green food to his stock. In addition to the native grasses, which retain through the cold months a considerable portion of succulent

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\* Cape of Good Hope lies in North Latitude, 34 deg. 23 min. 40 sec.

† Port Jackson in Australia, near where the sheep were introduced, is in 33 deg. 55 min. south latitude.



matter, rye, that grows luxuriantly, even on the seaboard, furnishes excellent food in winter.

3d. The coarseness of the grass of the western prairies, so well suited to other stock, are unfit for sheep. If therefore, it be improbable that we shall ever successfully compete with our transmontane brethren in the raising of black cattle, the obstacles in our way are not insurmountable in relation to sheep, which will thrive where neat cattle would starve.

It is well known that sheep delight in mountain and hilly lands.—While not one of the mountains of South Carolina rises above the range of the grasses, their freedom from rocks, facility of ascent, and the abundance of nutritious esculents by which they are distinguished, eminently fit them for the plough, and for purposes of sheep husbandry. If the valleys too, show a deep rich vegetable mould, hence adapted to the production of grain and the grasses, the streams which fertilize them give water power enough to drive all the machinery which the combined wealth of the people of the State, if not of the South, could erect. It may in fine be said, that South Carolina, situated in the same degree of north latitude with Leon, Estramadura, Old Castile, &c., in the richness and abundance of her wild grasses and shrubbery, enjoys an advantage over the mountain regions of Spain, where the most abundant flocks of the best sheep are raised.\*

The quantity of land necessary for the subsistence of sheep in this country, has been satisfactorily ascertained. On grain farms, Mr. Randall says, it is considered good economy to keep one sheep for every acre of cleared land which the farm contains; on those where mixed husbandry is practised, two; and on those exclusively devoted to sheep, three.

The nett profit of sheep husbandry in New York is found to be 4.06 or  $20\frac{1}{4}$  per cent.† on lands worth \$20 per acre. If the North River farmer, who is obliged to feed his sheep 5 months in the year, and whose lands cost 1350 per cent. more than similar lands would command in South Carolina, is enabled to realize under existing unfavorable circumstances, (the operation of the Tariff of '42, the change in the British Tariff, and the famine in Europe,) 13 per cent, surely the Greenville farmer will have it in his power, when aroused

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\* From the last census it appears that in South Carolina, the number of sheep was 232,981, of which Kershaw and Edgefield furnished the largest number, and Marlboro' and Richland the smallest.

† If 3 sheep can be sustained in the tide water and hilly zones of South Carolina on the herbage of an acre, without other fodder, which is known to be true, and land can be bought at \$1.50 per acre, then the same calculations would show a nett profit of \$4.32, or 280 per cent. on lands worth \$1.50 per acre.—*Mr. Randall.*

to energetic action, to make a profit fully commensurate with the many elements which so happily combine to encourage and sustain him.

I come now to speak of sheep walks constituting the basis of an effectual amelioration of the soil.

1st. The hill sides, rendered barren by washings, if seeded down in grass, would again be restored to fertility and value. The want of cohesion in the soil, and the most injudicious tillage arising in part from attempts to raise only one or two crops, have so washed and gullied large quantities of land as no longer to be cultivable; indeed, by their liability to increased washings, they endanger the fertility of the valleys below. To abandon them as unworthy of the owner's care, will not subserve his purpose. If planted in grass, especially Bermuda grass, (————) hereafter more particularly to be noticed, a requital for his providence and foresight, would be certain to ensue.

2nd. The second advantage is the substitution of mixed husbandry for the one crop practice. That a community can reach the goal of prosperity by the cultivation of a single staple, the history of South Carolina agriculture very satisfactorily attests; but if her products had been variant, that the deterioration of her lands, should such have been the result, would have been slower, and her general condition more encouraging, there are solid grounds for believing. If, however, with the lights now before us, her agricultural system be not radically changed, it will become a question, if it be not already one, whether the cotton culture has been to her a blessing or a curse. I am not insensible of the transcendent benefits that, for half a century, the Southern states in their great staple have conferred on perhaps every division of the globe. Unaided by the power which the downy fleece of a shrub has so long wielded, the progress to opulence and prosperity of the members of this confederacy would have been greatly retarded, and the Union far in the rear of the commanding position it now so proudly enjoys among the nations of the earth.\*

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* Value of Cotton <i>exported</i> from the United States in 4 years, from	
1821 to 1824,	\$86,585,463
Annual average,	21,646,366
Exported in 8 years from 1825 to 1832,	226,982,005
Annual average,	28,372,876
Exported in 10 years from 1833 to 1842,	573,715,741
Annual average,	57,371,574
Exported in 1843 and 1844,	103,183,307
Annual average,	51,591,653½

RECAPITULATION.

Value of Cotton <i>exported</i> from the United States in 24 years from	
1821 to 1844	\$990,467,516
Annual average,	41,269,479
The value of the Cotton <i>grown</i> in the U. S. in the 24 years was about	\$1155,180,000
Of which about \$170,120,000 was consumed at home.	



Where one occupies the labor and best grounds of any country, total exhaustion of the soil is nearly certain ; and the multiplication of insects, extirpable only by ceasing to grow the crop which constitutes its natural food, equally likely to follow. Dependence moreover on a single commodity, peculiarly liable to casualties, is unwise and in the long run opposed to self interest. By wind, rain, drought, or insects, it may be destroyed in a few weeks, if not days. When this takes place, all is lost. Upon the agriculture and commerce of other countries and their own, and even their political condition, its value greatly rests. If, from any of these causes, a depreciation in price results, the whole extent of the planter's income is effected. On the contrary where the culture of many of the fruits of the earth employs the farmer's time, the total failure or partial loss of one, would rarely, if ever, be followed by a similar calamity in reference to the others. It is fair therefore, to infer, that with the means of living comfortably and independently, he will always be provided. So sensible are our northern co-laborers of the correctness of this belief, that the main crop, tobacco in Maryland, and Wheat in New York, is planted to be reaped as clear profit; the other crops being set apart to defray ordinary and incidental expenses.

3d. The fallow system will be abandoned, and fallow crops take its place. The cultivator will become substantially a farmer, and no longer wear the insignia of a planter. It follows that one-third, in cases, one half, of the real estate in possession of many of our profession, might, in such an event, be sold, and the profits appropriated to the improvement of the remainder ; or converted into legacies for their children, instead of compelling them for the supposed want of room, to seek their bread in foreign climes. The amount of capital invested in land by individual proprietors, ought to be diminished. There is perhaps no barrier to agricultural progress which has attracted so little notice as the disposition to hold landed property incommensurate with the force actually engaged in its cultivation. No fact is better established, than that any quantity of ground, under the supervision and control of an intelligent practical man, will give larger returns and insure more comforts, than three times the area, in unskilful and improvident hands. As a rule universally to be observed, it is better to cultivate one acre, systematically manured, than three acres unprovided with appropriate pabulum, or only partially aided ; in other words, to own a small plot of ground, capable of being put in a garden-like condition, than the boasted occupier of immense tracts, a stranger perhaps to the plough or hoe, certainly to the artificial food designed for the maintenance and support of cultivable plants.

The secret of the accumulation of wealth lies not in disbursing the profits of the farm, in adding to its size, or in increasing the number of laborers, but in expending them in such improvements as the skillful and experienced eye may point out. This is the true and only mode of permanently enlarging the productive capital of an estate. By this means the owner of 100 acres may be the proprietor of as much land as the holder of five times that quantity, with the advantages among the many others, in favor of the former, that he pays less taxes, and is certain of a progressive improvement in the value of his property. Let the excess of income, then, be appropriated in draining—in reducing to culture every pond and morass within the inclosure—in good buildings—in substantial and durable fences, and where there is a necessity to purchase, in mineral or animal manures, and in judicious and economical experiments.

#### *The Grasses.*

4. The fourth advantage of mixed husbandry consists in the production of the most lucrative crop known to the cultivator of any region. The subject of the grasses at all times full of interest, is especially so at this time. In the lower country the weeds are usurping the place of grass, and in the middle and upper districts, the same insidious foe is steadily essaying to diminish the profits of labor.—The futile attempts to climatize the grasses of higher latitudes are ascribable, it may be asserted, to three causes:—1st. The sowing them in soils naturally unfit, or previously robbed of their fertility; 2d. the absence of fixed principles in the rotation of crops; and 3d. improper selections. The extent to which means have been used in this State, in overcoming the obstacles of nature, it is perhaps impossible accurately to ascertain; it is certain, however, that neither the grasses of Europe, nor of our Northern States can be successfully grown in but a very small portion of South Carolina, if the general concurrence of her farmers in that belief be assumed as satisfactory evidence.

While in Greenville, Herds grass,\* Lucerne, Timothy and Clover thrive encouragingly, especially the two first, in Pendleton and the adjacent districts, every experiment with these and other exotics, save three or four, have signally failed. One of the prominent exceptions is white clover, (*trifolium repens*.) which has been found in so many places where it was never sown, that many believe it to be a native.

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\* "An enterprising farmer of Greenville," says the Hon. B. F. Perry, "a few years ago sold \$100 worth of Herds grass from 3 or 4 acres of land deemed worthless."



In localities, red clover (*trifolium pratense*) succeeds well, but on rich bottom lands only—the hot months being unfavorable to its growth on high grounds. The Bermuda grass\* (*digitaria dactylon*) and the Muskeet grass (*holcus lanatus*) would flourish from the seaboard to the mountains. In the return it makes to the soil; being eaten with avidity by stock of every kind; growing luxuriantly on all soils—even the poorest; binding the loosest and most barren tracts; preventing the washing of hill sides and the widening of gullies; we find advantages in the Bermuda grass—so inimical to the cotton and potato culture—which no other enjoys. In looking exclusively to the establishment of permanent pastures and meadows, its inextirpable character is one of its highest recommendations. A large extent of the pine land region of the State fitted mainly for the raising of stock, might most advantageously be sown in this grass.

If, as some affirm, it is the weeds and hardy *carex*, and not the heat of the climate, that frustrate all our endeavors to acclimate the best grasses† of other countries, then a remedy in part will be found in repeated mowings which by destroying the weeds soon convert lands unfit for grain into good meadows.

In the selection of grass seeds, or in their mixture, the nature of the soil, the supply of water to which the habits of each are best adapted, and the objects which the farmer has in view, are considerations to be duly weighed. Some grasses are early, nutritious and productive, yet requiring more than two years to arrive at perfection. These are better fitted for permanent pasture, than alternate husbandry. Others, though highly nutritious, yield no aftermath; hence valuable for hay, but not for feeding purposes, if sown by themselves. Again, there are grasses coming to perfection early, having leaves abounding in alimentary matter, but whose culms or stalks, being comparatively worthless, render them profitable only for feeding purposes. As the nutritive property of grasses depends chiefly on the sugar which they contain, accurate knowledge on this subject is important, not only in reference to the providing of food, but as connected with the power of

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\* On the authority of Mr Affleck of Mississippi, 100 lbs. of this grass will afford upwards of 50 lbs. of dried hay of unsurpassed nutritive quality; and, as a regular crop, 5 tons per acre each season on good lands can be reaped. It might here be appropriately remarked, that 2 tons of timothy and 3 of clover are far above a medium yield at the North.

† Mr. Ruffin is of opinion, that its locality and the perfection of its growth, are fixed much more by peculiarity of soil than by latitude, and that by marling and liming, neither the sandy soil, nor hot and dry climate of Virginia have prevented the raising of profitable crops of clover.

the grasses to impoverish the soil. The farmer should also know, that all kinds of grasses contain in the outer parts of their leaves and stalks a large quantity of silicic acid, and potash in the form of acid silicate of potash. The want of this salt is the reason why on sandy and calcareous soils a luxuriant crop of grass is never found\*. In most cases, our failure to naturalize several of the best grasses of other climes is probably owing to the inadequacy or injudicious application of the means so generally adopted. A resort to other ways and better digested modes, aided by the incentive of associated strength, would, it is conjectured, soon effect more gratifying results; at any rate, it would definitely settle a question of increasing interest, even to the lower division of our State. There are over 300 species of grass, and although perhaps all of them have their favorite situations, yet by intelligent management, many might become naturalized without losing a single valuable quality. As it is certain that the fertility of the soil is the first element of success, it is equally true as a general rule, that lime or marl is the most necessary of all the fertilizers. Where either is used, or if on sandy lands, clay be applied, the soils will then be in a condition to support a very superior description of grasses to those it had been accustomed to produce. Until, however, experiments, instituted and perseveringly prosecuted by our local agricultural societies, shall have satisfied the community on the many interesting points involved in the general inquiry, to the raising of our native grasses ought the prudent farmer to direct his efforts. Of these, the Crab or Crop grass (*Digitaria sanguinalis*), and the Crow-foot (*Eleusina Indica*), are the best for hay, and thrive in cultivated grounds from June until frost. The rice grass,† (*Seersia Orizoides*), common to all parts of the State, but flourishing only in running water, the swamp grass and the "woods grass‡," are also of great value. The wild okra, (*Viola pabrata*), the Partridge berry, (*Mitchella repens*), the wild pea vine and several other esculents, flourish in most natural pastures from early spring until November.

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\* Liebig.

† In appearance and its affinity for water, it strongly resembles the plant from which it derives its name. The hay is cured with one day's sun, and with ordinary care 3 tons per acre are readily reaped. It grows from 3 to 4 feet high. All animals eat it with avidity.—*Hon. C. C. Pinckney*.

‡ This grass is perennial and springs up in the woods after they are burned in winter. It lasts all summer, and provides sufficient food for sheep during the entire winter, except when snow is on the ground, which is very seldom, and usually lasts only a few days. The "woods grass" is confined principally to that strip of country from 20 to 30 miles wide, and extending through North and South Carolina, east of the Blue Ridge.—*Hon. Mr. Simpson*.



The conviction on the public mind has long been that the hay grasses cannot be successfully grown in the Southern States. In obedience to what appears to be a law of nature, it is undeniable, that the grasses do acquire in northern countries a succulency and consistency unattainable in warmer latitudes. Forced to a rapid fructification before they have had time to concoct their juices, the meadows of the South do not afford provender sufficiently rich and nutritious to raise and keep animals in a thrifty condition without grain. This, however, is only theoretically true; experience has not yet confirmed it.

It is an encouraging fact, that the small quantity of domestic hay, the produce of the neighboring parishes, sold in Charleston, has usually commanded within  $12\frac{1}{2}$  cents per 100 lbs. as much as that so extensively imported from the Northern and Eastern States.—Whether the market price affords a correct criterion of the difference in intrinsic value between the domestic and foreign article, no means of positive ascertainment exists. That the former nevertheless is a readily vendible commodity and at compensating prices too, is of itself one of the many indications that several crops, unknown to our State are yet to reward well directed industry. In each of the three great divisions of South Carolina there is an immense extent of ground peculiarly adapted to permanent pastures, and nearly an equally large area well suited to the hay grasses. That in all of our fenny lands, including many of the swamps, where the substratum is sand, to seed them down in grass, would, in a series of years, prove to be a more profitable investment than if cultivated in cotton, rice or corn, I feel warranted in stating, if a few experiments may be relied upon. Much of the brackish lands of the State furnish a soil almost too rich for cultivation in any of our staple commodities—certainly for cotton. On these, one shallow ploughing, in the spring, has been known to produce a crop of crab grass 4 feet high, and averaging 3 tons per acre. These considerations and facts show that, in the establishment of meadows for the raising of stock, or the making of hay for sale, the contest between the producer here and abroad will be in the quality and not the quantity of the article. If to the acre as large a yield may be expected on similar lands in this State, the getting it to market earlier by one or two months, in addition to other obvious advantages, will in a great measure, if not fully, compensate for the difference in the value of nutritive matter which is accorded to plants of a cooler region. That lands in grass will produce a larger net profit than when planted in grain, has long

been most satisfactorily ascertained in those countries of Europe where Agriculture, from necessity, has attained a very high state of improvement. In the cultivation of the grasses, not only great profit, at an inconsiderable expenditure of labor is realized, but a vast amelioration of the soil is the certain result. It is a practical knowledge of this two-fold benefit which renders the lands of Holland higher in value than those of any other country; which induces their calculating cultivators to prefer the importation of bread stuffs to a diminished rearing of their grass crops; and which influences the British farmer to pay for the rent of meadow grounds from \$10 to \$20 an acre. In this country, for the same reason, the rents, profits and prices of land, are the highest where grass receives the most attention.

To the farmer who is the owner only of a few slaves, or whose landed estate is small, the subject of the grasses, whether to be mown for hay, or used for grazing, is one of paramount interest. That he should look to this crop as the one best calculated, under the circumstances in which he is placed to yield him the highest remuneration, if the experience of the best farmers in other sections of our country, and in the old world, do not satisfy him, his own experiments, if he can be persuaded to make them, will, it is confidently believed, soon dissipate all doubts he may now entertain of the matter.

#### *Rotation of Crops.*

The subject of a rotation of crops, it is hazarding but little to assert, is not understood in the cotton-growing region; nor perhaps in the United States. The unsoundness of the excretionary theory of De Candolle has at length been satisfactorily determined by a Scotch chemist,\* who has re-established the principle, that every plant abstracts from the soil its specific aliment, of which, by long cultivation in a single crop it may be wholly deprived; and that unless this aliment be restored, it must remain unfit for profitable cultivation. When arable land is allowed to lie fallow for two or three years, its productive capacity becomes greatly improved. By the rotting of the grass†, which absorbs no potash, and the decomposition of the substances by which saline ingredients are let free, it is again enabled to reward the labor of the husbandman. The fact and the reason soon led to a broader field of examination. It is now known

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\* Alfred Gyde, who has shown that the minute excretions of plants have the same composition with their sap. He watered plants with a solution of their excretions not only without injury, but to their manifest benefit.

† Grass contains carbon, 45 per cent; hydrogen, 5; oxygen, 38; nitrogen, 1½ and ashes, 9 per cent.



that the injury to the land from a green crop is less than if it had been allowed to ripen. According to the chemical researches of M. Saussure, the ashes of the plants of peas (*Pisum Sativum*) when green, contain only 17.25 per cent of phosphate of lime, but that when ripe, they yield 22 per cent. The wheat plant which held 10.75 per cent in flower, contained 11.75 per cent. in its matured state. The same result was obtained from other plants. Broad leaved plants absorb the most from the atmosphere; plants having the smallest system of leaves, most exhaust the soil of common nutritive matter. Plants withdrawing the same aliment from the soil will mutually injure one another, if grown beside each other; on the contrary, if they absorb substances of different kinds, they may not only advantageously be cultivated side by side, but be reared in succession. Where potash abounds, tobacco might be made to follow wheat, or wheat tobacco. In the cereals, phosphates are invariably present; the narcotic plants do not require these salts. The wool of cotton subtracts from the soil a mere trace of the phosphate of potassa; the seed 31.51 per cent.; the wool 25.44 per cent. of the phosphate of lime; the seed 61.64 per cent. The ash of the cotton seed moreover has treble the phosphoric acid, (the most valued mineral constituent of a soil) possessed by the fibre. Corn takes from the soil less potassa and lime, but more phosphoric acid, than cotton; and sweet potatoes more potassa but less lime and phosphoric acid. The main crops of the planter, therefore, absorb the same ingredients from the soil, though in different proportions. The practice of planting oats on land set apart for cotton is obviously injurious, especially if the cotton stalks be removed or burnt; for not only do you prevent a large return to the soil of the very elements it most needs, but a crop succeeds which robs it of a considerable portion of potash.\*

The curing of potato vines is a severe blow to the land from which these are taken. When the vines are given back to the soil, the potato is not an exhausting crop.†

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\* The reason why oats exhausts land is here explained.

† These considerations go far to prove, that alternate husbandry is not unworthy of the most serious notice of the planter as well as farmer. The low latitudes is the home of the insect tribe, which multiply rapidly in proportion to the heat and moisture of the climate. To their propagation and extension, the improvident efforts of man powerfully contribute. Olivier, a member of the Institute of France, has satisfactorily ascertained, that the increase of insects is illimitable, when the same soil presents the same crop for several years in succession, or even crops of analogous species. But when a crop intervenes, on which these insects cannot live, as peas, after cotton or corn, then the whole race of these insects perish from the field for want of proper nourishment for their larvæ.

The general question is now presented, what plants ought to succeed each other? Manifestly those which receive their nourishment from the atmosphere, should follow the plants that owe their strength and maturity to the elements of the soil, those which depend chiefly on one element of the soil to succeed others, which call for some other. Perpendicular-rooting plants to take the place of such as root horizontally, and broad-leaved plants those that have a small system of leaves. The grasses and cereals take up a large quantity of silica from the soil; turnips, the beet and Irish potato, potash; the pea, tobacco and clover, lime; wheat, phosphate of lime; cotton, Indian corn and the sweet potato, potassa, lime and phosphoric acid; these three, therefore, should not succeed each other, unless the land be allowed to rest one season, and appropriate manure applied. White crops should follow green crops. The former exhausts the soil of nitrogen; the latter fixes in the soil nitrogen derived from the soil. The large quantity of phosphoric acid, lime and potassa which the cottonseed contains, is the reason of its value as a manure, and why soils long cropped with cotton becomes unproductive. Without attempting to express an opinion as to the best rotation for the ordinary crops of the State, I ask your attention to two instruments of amelioration and improvement, which in practice are not appreciated as their intrinsic value demands; these are the sweet potato (*Convolvulus Batatus*) and the cow pea. In all suggested rotations, roots seem to have been designedly omitted. Now, these perform a highly important office. By tap-rooted and tuberous-rooted plants, a thorough opening and deep piercing of the soil is effected, and if hogs be allowed to gratify their appetite by their own labor, a very economical and effectual subsoil ploughing is secured. By the labor of this animal the best results even on the light and blowing lands of the Sea Islands have been obtained; and of all the instruments for the extirpation of nut grass, their snout is the best. The large return which the potato makes to the soil, by which its exhausting power is much reduced, if not entirely overcome, and the fine condition in which it leaves the ground, are advantages that few plants enjoy. In the reclamation of land long made sterile by broom grass, the potato slip crop, easily planted and attended, will be found an economical agent. To our southern country the potato is an invaluable root. A native of Peru,\* it is not known when or by whom its culture was introduced

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\*While Pizarro was in the Bay of Tumbez, "balsas," says Prescott, in his *Conquest of Peru* vol. 2, p. 273, "were seen steering for the vessel, laden with bananas, plantains, yuca, Indian corn, *sweet potatoes*, pine apples, &c." Again p. 327, a large portion of the Island of Puná, lying at no great distance from the Bay of Tumbez, (south latitude about 3 deg. 40 min.) bloomed with plantations; of cacao, of the *sweet potato*, and the different products of a tropical clime."



into the United States. This great crop is to the slave-holding States what the Irish potato is to the people of the Emerald Isle. The cheapness of its production; the wholesomeness and nutritious quality of the food; the great facility of cooking it; independent of its advantages as a tillage crop; are so many reasons in favor of its extended culture for a more bountiful supply, and even for the foreign market. Its admitted liability to rot, unfits it, it is said, for exportation. If, however, as soon as dug, they be packed away in airtight barrels, there is no reason why they should not keep as well as in hills or cellars. Ripening so early in the season, they might be made an article of profitable traffic, as a vegetable for the northern and eastern markets. In delicacy and sweetness of flavor, and amount of nutriment, the Irish potato is far inferior to it. As food for stock of all kinds, it is much to be preferred to the ruta бага turnip; and as the yield per acre is greater on land equally good, the culture of the one should yield to that of the other. It may in fine be asserted, that this esculent will yield more solid nutritious matter, alike congenial to the constitution of beast and man, to the same space, than any other plant known to the cultivator of the ground, and at a less cost.\*

### *The Cow Pea.*

Of all fodder crops, there is not one equal to this pea, which is emphatically the clover of the Southern country. It is adapted to all dry soils; most abundantly rewards the labor bestowed upon it; derives its chief nourishment from the atmosphere; and affords in the grain and cured haulms or straw, highly nutritious and healthy food

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\* Since the reading of this paper before the Society, the two following interesting facts have been communicated to the writer by Mr. John Townsend of Edisto Island.

1. Between the 5th of November last, when he dug a portion of his slip potato crop, and the 26th of the same month, when the remainder was housed, the increase of the common yam, as determined by the product of four beds, was 11 lbs. per bed of 105 feet, or 924 lbs. per acre; and of the yellow yam, 47 lbs. per bed, or 3948 lbs. per acre. At 50 lbs. per week, (the usual quantity is 42 lbs.) the increased yield of the former would support one laborer for 18 week, and the latter for 78 weeks.

2. The average product of 4 beds of the common yam was 138 lbs., equivalent to 11592 to the acre; of the yellow yam, 231 lbs. or per acre 19404 l s. At 50 lbs. a week, the former would furnish food enough for one person for 4 years, 5 months and 3 weeks; the latter for 7 years and 6 months, or a family of 6 members for 1 year and 3 months.

The first fact admonishes the planter to await the coming of frost before he begins the harvesting of this crop; the second, that by judicious selection and proper cultivation, 1-6, or certainly  $\frac{1}{4}$  of an acre, per working hand, it is only necessary to plant. This will give food enough for 6 months for the plantation.

for stock of every description. As a manurè crop for weak soils, whether it be reaped or ploughed under before or after it attains maturity,\* it is deservedly entitled to occupy the very first rank. Of the value of the field pea of this country and of Europe, inferior in its meliorating properties to the cow pea, the analyses of Payen and Boussingault, have furnished us with certain information. It appears then, that with regard to the straws of the small grains, pea straw, as a fertilizer, is worth from 5 to 9 times as much, and that "it actually equals farm yard dung."† Experiments in this State with the cow pea, seem to confirm this opinion: On exhausted clay hills, nearly too poor to be furnished with a meagre covering of vegetation, the annual planting of peas, though the fruit as well as stalks and vines, were regularly removed, have been made to yield, in 2 or 3 years, fair crops of corn, oats and wheat. The late William Lowndes, on his farm in the vicinity of Charleston, planted oats and peas, alternately ploughing in the former in autumn as a manure for the latter. By this means in 3 consecutive years, he realized successively 8, 15, and 30 bushels of oats per acre; in other words, every year the crop was doubled. Cotton on the sandy lands of the sea-shore, that succeeds peas, exhibits the appearance of having been aided in its productive power by the best manure known to the planter. Clay land however, is better adapted to its culture, and where its enriching effects are more surely developed.

As two crops of peas for manuring purposes are obtainable from the same field in the year, if the first be turned under in June, and the other before frost, the land in productiveness will be found to have been much increased. This manure too is more certain in its results, less affected by drought or extreme wetness, and more conducive to the health of the growing plant than any kind of highly stimulating aliment. On lands too sterile for other products, the experimenter will be satisfied, that his labor has not been fruitlessly expended.—On rich soils from 20 to 25 bushels per acre have been produced, and planted between corn, an acre has yielded 19 bushels. In the improvement of worn out lands, and as an element in a successful

\* Plants in drying, lose the nitrogen contained in their sap, give up their saline matters, and are resolved more or less completely into carbonic acid, which escapes into the air, and is so far lost.—*Liebig*.

† <i>Water per 100.</i>	<i>Nitrogen in a</i>	<i>Quantity according</i>	<i>Equivalent accord-</i>
	<i>100 of matter.</i>	<i>to state.</i>	<i>ing to state.</i>
			WET.
From farm			
yard dung, 79.3—1.95	0.41—100	100—100	100
Pea Straw, 8.5—1.95	1.79—100	447.5—100	22



rotation, this plant is a powerful auxiliary. The Chickasaw variety, it is said, once planted, is with difficulty eradicated ; and experiments in Pickens would show that the rooting of hogs and the culture of an oat crop are incapable of destroying it. As it is as much benefited by plaster as clover, the cheapness of the manure, the inconsiderable quantity required, and the facility of applying it, are together an additional reason in favor of a very general and extensive cultivation of the pea, the secret of whose fecundating power lies in the large amount (53 per cent.) of potash, and the carbon and nitrogen that it contains. Whatever position therefore, clover occupies in any rotation in more northern climes, the cow pea in this State should be substituted. The objection that certain lands are adapted only to cotton, and that these are necessarily depastured every second year ; hence, as stock cannot be dispensed with, the practice recommended, the planter is unable to adopt, is believed to be untenable. It is untrue, that on our black lands no reliance for a cotton crop, under any system of management, can be placed. My own experience corroborated by the testimony of others, assures me, that by the spade and calcareous manures the profits on such soils, whether resting on clay or not, are *communibus annis*, nearly as certain, except for the finer descriptions of cotton, as the best high grounds of the State. But if the land be planted in peas, how shall we dispose of the stock?—The question will then be one of calculation. Is the amount of benefit derivable from their excrements less than that which may be expected from this vegetable, in vigorous and nearly full growth, ploughed in? If so, reduce them to a number only sufficient to supply the owner with butter, milk, beef, mutton and veal. I will merely add in conclusion, that large stocks is one prominent cause of the rapid deterioration of our lands.

In advocating the expediency of substituting the cow pea for clover, as a manure crop, it must not be inferred that I hold the latter to be incapable of successful cultivation. The belief, I know, is almost universal, that our arid soil and hot sun operate as an insurmountable barrier to the production of this well established enricher of the soil. Yet experiments in Pickens, in Abbeville, in Newberry, Spartanburg and Greenville, in the Parish of St. Thomas, and even on the sea-shore, conclusively shew that, if the proper means be used, red clover, (*trifolium pratense*) which in higher latitudes is taking the place of almost every other kind of ameliorating crop, might profitably be raised in at least the most northern Districts of South Carolina. In the opinion of two highly competent judges,\* founded on

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\* Messrs. Ruffin and Tuomey.

personal knowledge, the Upper Division of the State need only calca-reous manure effectually to remove the doubts of the incredulous concerning the advantageous growing of clover.\* Rail roads, in supplying them with marl and lime, would soon deprive the farmers of every excuse in not devoting a due share of their attention to this subject of increasing agricultural interest.

I have thus discussed in a summary and very imperfect manner, all of the prominent topics involved in the matter submitted to my consideration. Are my representations true or false? Are the conclusions I have drawn, sound, or are they the mere chimeras of an over excited imagination? I am aware that the past as well as present might, in appearance, be triumphantly arrayed, to invalidate the credibility of the witnesses nature herself has furnished. But four years have elapsed since thousands of our fellow-citizens, under the influence of want, sought an asylum in other regions. The bettering of their temporal condition, still incites the restless and discontented, permanently to dissolve the ties that unite them to home, kindred and friends. The interest on agriculture falls far below other investments of capital. But an inconsiderable portion of the State is actually in tilth, and of the portion at one time so abundant in its yield, perhaps one fourth has been abandoned. This is a sombre picture, and man alone is accountable for its creation and public exhibition.—The talents committed to his charge have been hid only to depreciate in value by the abrading effects of time. To the dissemination of knowledge he has closed his eyes, and reason, blindfolded, impels and directs his actions. Shall this disgraceful and melancholy scene continue to be the object of our contemplation by day, and disturb our slumbers at night?

Gentlemen, be not deceived. The agriculture of South Carolina must be ameliorated, and that quickly, or the hand writing on the wall will announce her fate. The condition of our country is favorable to enterprize and decided action. Free trade is beginning to pour forth its blessings upon the human race. A single dark spot alone obscures the full effulgence of our political sun. Hereafter, upon our own unrestricted energies, it may be, we shall be permitted to rely; if these be intelligently directed, we shall yet be enabled to restore the land of the Palmetto to its former condition of enviable productiveness, and to constitute it anew the home of a happy, prosperous and contented people.

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‡ Buckwheat (*Polygonum fagopyrum*) is also a manure plant, and one of the most economical and convenient that the farmer can employ. It will succeed where clover, from exhaustion of the soil, is incapable of growing. For domestic use, it is successfully raised in the tide water zone of our State.—See S. A. 1832—Vol. 5—p. 113.



## ERRATA.

- Page 5. In the note on "flax," for "*usitatissimum*," read "*usitatissimum*."
- " 13. In the note on Indigo, for "*Indigo fera cerulea*," read "*Indigofera cœrulea*."
- " 14. Line 14, strike out "further."
- " 14. Note, Lat.  $23^{\circ} 10'$ , refers to Canton.
- " " " "  $39^{\circ} 54'$ , refere to Pekin.
- " 15. Last line, for "bean," read "bene."
- " 18. Line 16, strike out "now."
- " " Last line but two, for "Australia," read "Australis."
- " 19. 8th line from bottom, for "duties," read "duty."
- " 24. 4th line, insert "from," between "and," and "which."
- " " 28th line, beginning with "So far as our own State is concerned, &c." should read and be punctuated thus:  
"So far as our own State is concerned, at least, it is certainly true of the lower section of South Carolina, in all the Parishes, &c., &c."
- " 25. 9th line, for "Districts," read "District."
- " 28. 16th line, for "terminus," read "termini."
- " 29. 22d line, insert "boundary," between "northern," and "with."
- " 32. 3d line from bottom, strike out "upon."
- " 44. Diagram.—The author intended A and B, to stand on the same side of the river, and C on the opposite. The reader should bear this in mind in order to a proper understanding of what is said.
- " 45. 2d line from bottom, insert the words "by the owner," between "operation," and of."
- " 46. 3d line, insert "and," between "around," and "along."
- " 50. 8th line from bottom, for "power," read "powers."
- " 53. 10th line, for "judiciously," read "systematically."
- " 54. 8th line from bottom, insert a semi-colon, and the word "for," between "tenant," and "with."
- " 55. 14th line, for "while it will, under the latter, dry in winter," read, "while they will keep the latter dry in winter."

